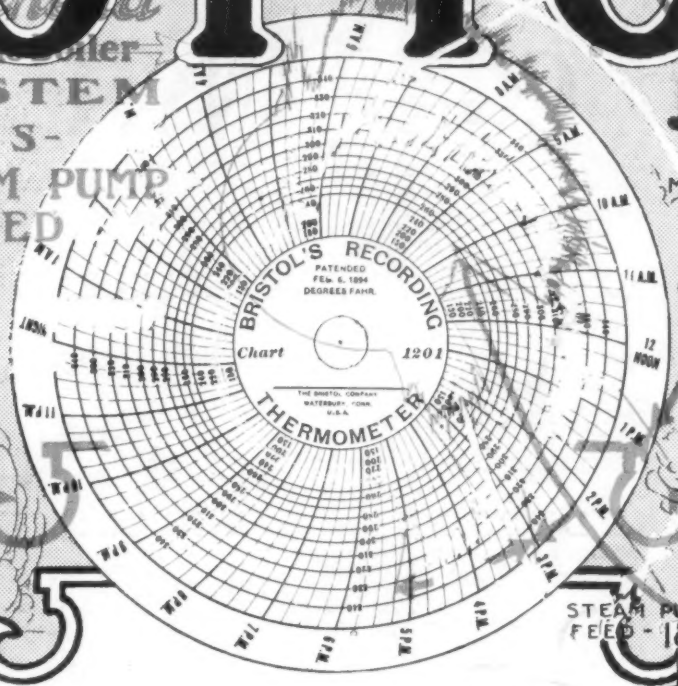
COTTON

MARCH 1921

SYSTEM -VS- STEAM PUMP FEED

LME EIGHTY-FIVE
BER FIVE
CENTS A COPY



MOREHEAD SYSTEM FEEDING BOILERS AT 320°

STEAM PUMP FEED - 180

PUBLISHED MONTHLY BY
W.R.C. SMITH PUB. CO.
DALTON AND ATLANTA, GA

MOREHEAD SYSTEM

Saving 20% on Coal In Every Industry in this Country

Only by draining steam heated equipment of all condensation as it forms can you expect efficient, economical operation of your steam heated machinery and apparatus.

And only by returning this condensation direct to your boilers—without cooling the boiling hot water to a temperature that permits the operation of a steam pump—can you reduce your fuel costs to the lowest possible minimum.

The Morehead Back-to-Boiler System is solving the steam drainage and boiler feeding problem for hundreds of manufacturers because—

It automatically keeps every ounce of condensation drained from steam heated equipment.

It returns the condensation to boilers as pure hot feed water—ready to be used again and lowers fuel costs 20 to 50 per cent.

It removes the need for a steam pump altogether.

It can be easily added to your equipment without disturbing the operation of your power plant.

We will gladly refer you to manufacturers in your locality who have lowered their operating costs 20 to 50 per cent with the Morehead System. Write for catalog.

Morehead Manufacturing Company, Detroit, Michigan

Canadian Morehead Mfg. Co., Woodstock, Ont., for Dominion of Canada.

The "Morehead" Return Trap

Positively Drains All Types of Steam Apparatus

Delivers Condensation As Pure Hot Water to Boiler Under All Conditions at Maximum Temperature

Morehead

"BACK-TO-BOILER-SYSTEM"

CIBA COMPANY, Inc.

Sole representatives in the United States of the

SOCIETY OF CHEMICAL INDUSTRY IN BASLE, SWITZERLAND

Announce having taken over the
business heretofore conducted by

ANILINE DYES AND CHEMICALS, INC.

Cedar and Washington Streets, New York

with their branch offices in

Boston, Philadelphia, Chicago, Columbus, Ga.

Ciba Company, Inc., will distribute the products of

SOCIETY OF CHEMICAL INDUSTRY IN BASLE—SWITZERLAND

and their various plants and
allied works, including the

CINCINNATI CHEMICAL WORKS, CINCINNATI, OHIO.

Special attention is called to
Ciba and Cibanone Vat Colors: Patented.
Basics—Rhodamine B and 6G—Phosphines
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THE BEST
NORTHROP LOOM
TRADE-MARK REG. U. S. PAT. OFF.

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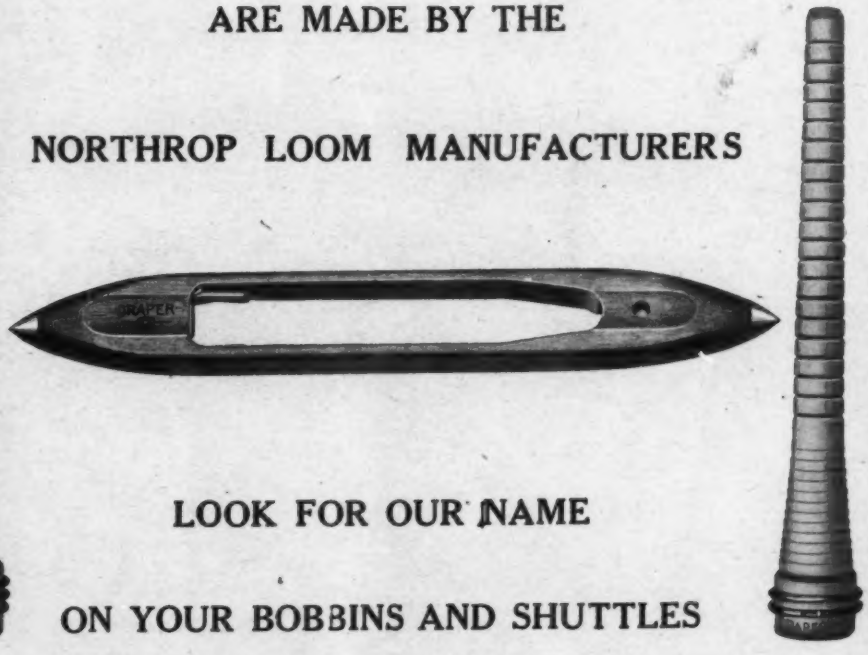
ARE MADE BY THE

NORTHROP LOOM MANUFACTURERS



LOOK FOR OUR NAME

ON YOUR BOBBINS AND SHUTTLES

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

SOUTHERN OFFICE
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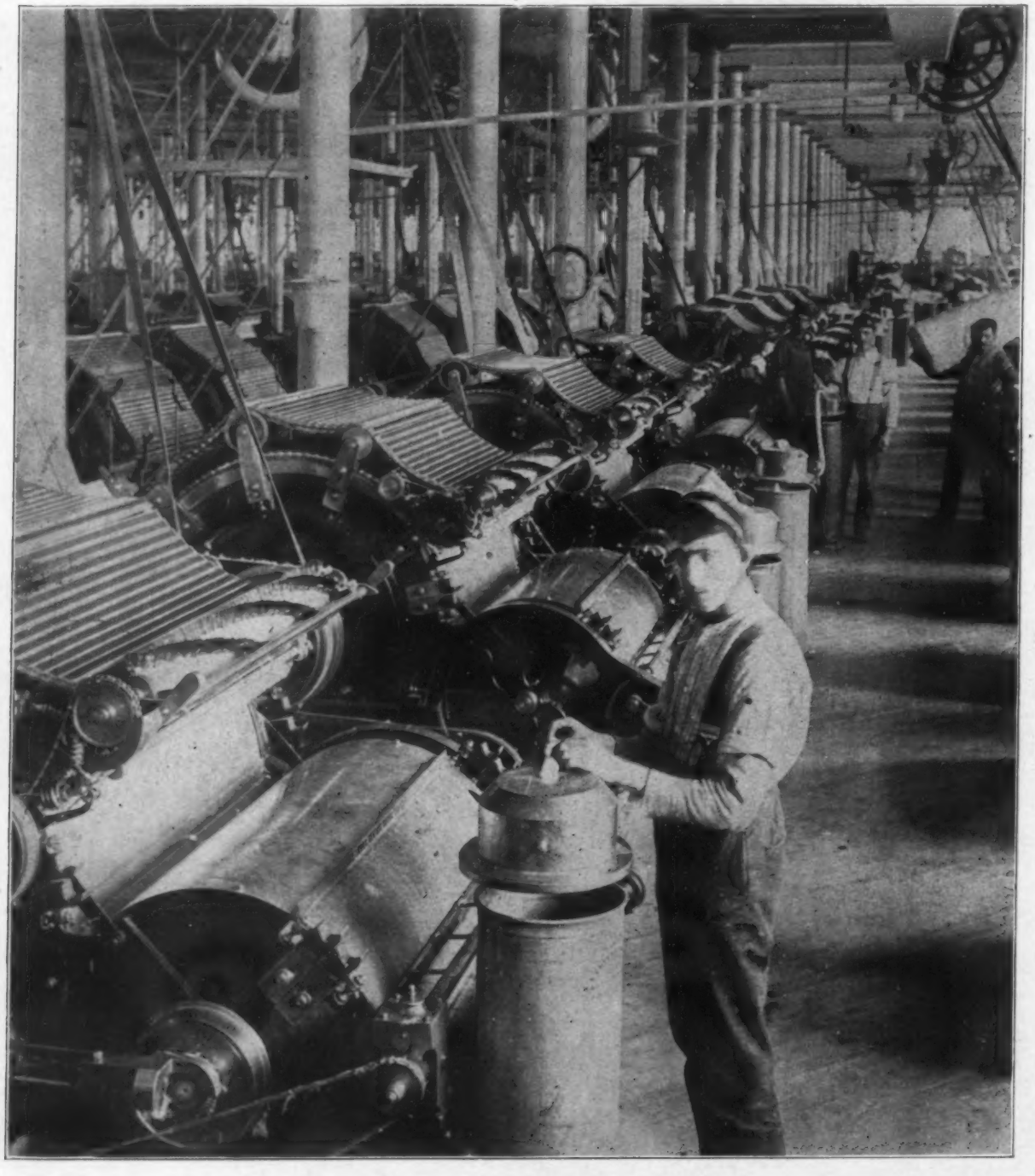
To Reduce Your Unit Costs



HYATT BEARINGS FOR

Use Improved Machinery

Low unit cost is not always given careful consideration when the demand is "production at any cost" but even then mills that operate economically have a distinct advantage. Reduction of unit cost is of vital importance in times like these when business is secured on the basis of quality and price.

The best way to reduce cost per unit is to do away with old fashioned wasteful methods by installing modern improved machinery.

Hyatt Roller Bearings are a logical part of improved machinery. These sturdy bearings make textile machinery durable and dependable, insure continuous operation and eliminate shut downs for repairs. And they effect worthwhile savings in power, lubrication, and maintenance costs.

Reduce your unit cost to a minimum by specifying Hyatt equipped textile machinery.

1985

MOTOR BEARINGS DIVISION
DETROIT, MICHIGAN

HYATT ROLLER BEARING COMPANY
INDUSTRIAL BEARINGS DIVISION
NEW YORK, N. Y.

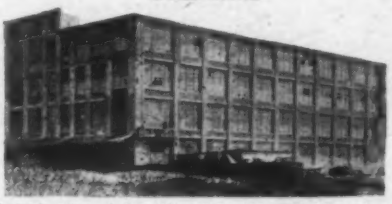
TRACTOR BEARINGS DIVISION
CHICAGO, ILLINOS

Manufacturers of Bearings for Mine Cars, Ore Cars, Steel Mill Cars, Roller Tables, Trolleys, Cranes, Hoists, Machine Tools Line Shafts, Countershafts, Concrete Machinery, Textile Machinery, Conveyors, Lift Trucks, Industrial Trucks, Railway Service Cars, Storage Battery Locomotives, etc.

TEXTILE MACHINERY

Textile Mills Everywhere Indorse WindoWalls

Connecticut



International Textile Co., Inc., Bridgeport
Aberthaw Construction Company, Contractors.

Texas

Miller Company, Houston
Wm. Ward Watkins, Archt.
Tom Tellepsen, Contr.

Maine

Sanford Mills, Sanford
Geo. A. Clark, Archt. & Engr.
Turner Construction Co., Contrs.

In Maine or in Florida; New York or California—industrial buildings are pretty certain to be daylighted by Fenestra WindoWalls. This is because in each particular locality—they fill a definite need as does no other window construction.

Particularly true is this of the textile industry. For the cold New England winters, Fenestra engineers have designed WindoWalls which reduce condensation to a minimum, and, while admitting a great amount of daylight, give protection against wind, rain and snow.

In the Southern Mills, the essential thing is ventilation—together with proper daylighting. These needs, too, are supplied by Fenestra as by no other form of window. In Carolina, Tennessee, Georgia, and in fact in all the Southern and Coast states, mill owners have given hearty endorsement to Windowalls, as the one satisfactory answer to the ventilation problem.

This national endorsement of Fenestra by the textile industry is, of course, due primarily, to the accepted superiority of the product. Equally important, however, is the organization that stands back of the product.

Twenty-four warehouses, advantageously located throughout the entire country, are an important factor in this national use of WindoWalls by the mills. It is a decided advantage to know that your sash can be supplied immediately from your local warehouse.

Then, too, there are sales and engineering offices in the principal cities—ready to help you in selecting and laying out your sash; together with an extensive field erection organization.

Detroit Steel Products Company
4444 East Grand Boulevard, Detroit Michigan
Canadian Metal Window & Steel Products Limited, Toronto, Canada

Fenestra
Steel WindoWalls

Sidewall Sash Continuous Sash Counterbalanced Sash
Underwriter's Labeled Sash Mechanical Operators

Louisiana

National Hosiery Mills, New Orleans
G. E. & E. E. Reimann, Contractors
M. H. Goldstein, Architect

WHEREVER there are textile mills, Fenestra WindoWalls are used and appreciated by textile builders. Some idea of the number of states in which WindoWalls have been used, can be gathered from the following list which is made up of a very few installations picked at random from the list of Fenestra installations in each state. The Fenestra organization—with warehouses in all parts of the country to insure prompt shipment, has been a great factor in bringing about this wide acceptance and use of WindoWalls in textile mills.

Alabama
Hamilton Carhartt Mills, Mobile.
Osprey Mills, Montgomery.

California
Pacific Orient Co., San Francisco.
Western Milling Co., Oakland.

Connecticut
Atlantic Cotton Co., Norwich.
Goodyear Cotton Mills, Goodyear.

District of Columbia
Durham Hosiery Mill, Washington.

Georgia
Bibb Manufacturing Co., Columbus.
Georgia Cotton Mills, Griffin.

Illinois
Paramount Knitting Co., Chicago.
Rock River Woolen Mills, Rockford.

Indiana
M. C. Cotton & Textile Co., Michigan City.
Mishawaka Woolen Mfg. Co., Mishawaka.

Kentucky
Mayfield Woolen Mills, Inc., Mayfield.
Henderson Cotton Mills, Henderson.

Louisiana
Orleans Cotton Mill, New Orleans.
National Hosiery Mills, New Orleans.

Massachusetts
Merrimac Mills, Methuen.
American Woolen Co., Lawrence.

Maine
Goodall Worsted Co., Sanford.
Sanford Mills, Sanford.

Michigan
Western Knitting Mills, Rochester.
Columbia Mills, Inc., Saginaw.

Minnesota
F. A. Patrick & Co. Woolen Mill, Duluth.

Mississippi
McComb Cotton Mills, McComb.
Tupelo Cotton Mills, Tupelo.

Missouri
Chester Knitting Co., St. Louis.

New Hampshire
Nashua Mfg. Co., Nashua.

North Carolina
Ronda Cotton Mills, Inc., Ronda.
Definance Sox Mills, Inc., Charlotte.

New Jersey
Passaic Worsted Spinning Co., Passaic.
Interwoven Mills, Inc., New Brunswick.

New York
Susquehanna Silk Mill Co., New York.
Passaic Cotton Mills, New York.

Ohio
National Woolen Co., Cleveland.
Colonial Cotton Mills, Cleveland.

Pennsylvania
Moorehead Knitting Co., Inc., Harrisburg.
Onta Spinning Mills, Philadelphia.

Rhode Island
American Woolen Co., Providence.
French Worsted Co. Mill, Woonsocket.

South Carolina
American Cotton Mills, Columbia.
Marlboro Cotton Mills, McColl.

Tennessee
Summerville Mills, Chattanooga.

Texas
Texas Cotton Mills Co., McKinney.
Southern Cotton Mill, San Antonio.

Utah
Logan Knitting Co., Logan.

Virginia
Riverside & Dan River Cotton Mills, Danville.
Grey Hosiery Mills, Bristol.

Vermont
Gay Brothers Co. Mill, Gavendish.

West Virginia
Dunn Woolen Mills, Martinsburg.
The Interwoven Mills, Inc., Martinsburg.

Wisconsin
Black Cat Textiles Co., Milwaukee.

North Carolina

Rex Spinning Co., Ranlo
J. H. Mayes, Architect
Watson Engineering Co., Contrs.

California

California Cotton Mills Co., Oakland
A. C. Griewank, Engineer

Detroit Steel Products Company
4444 East Grand Boulevard, Detroit, Michigan
Canadian Metal Window & Steel Products Limited, Toronto, Canada

Fenestra
Steel WindoWalls

Sidewall Sash — Continuous Sash — Counterbalanced Sash
Underwriter's Labeled Sash — Mechanical Operators

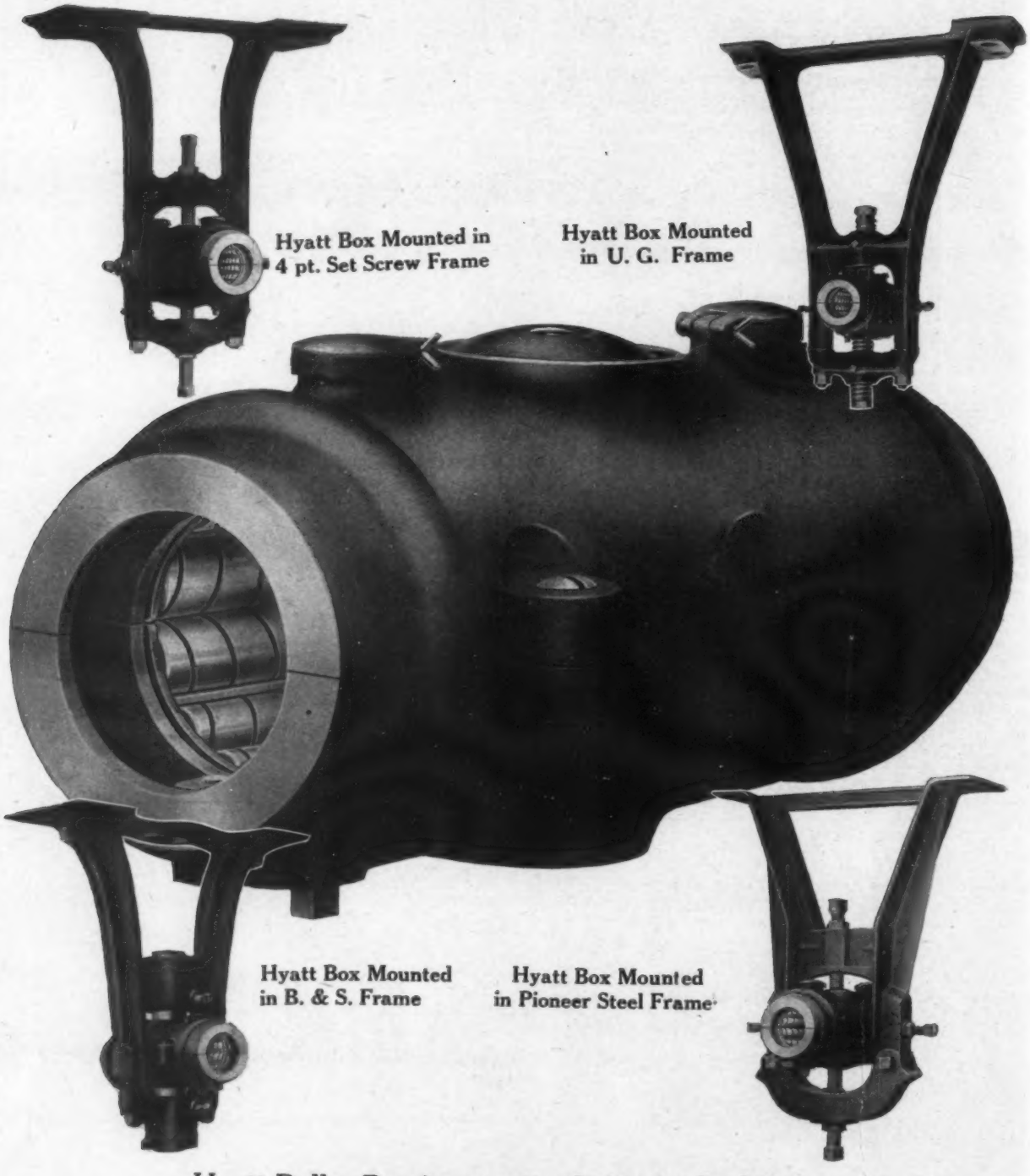
Wisconsin

Holeproof Hosiery Mills, Milwaukee
Lockwood, Greene & Co., Archts. & Engrs.
W. W. Oeflein, Contr.

Tennessee

Thatcher Spinning Mills, Chattanooga
J. E. Sirrine, Engineer
Turner Construction Co., Contractors

"Human Inertia is the Problem


Hyatt Box Mounted in 4 pt. Set Screw Frame
Hyatt Box Mounted in U. G. Frame
Hyatt Box Mounted in B. & S. Frame
Hyatt Box Mounted in Pioneer Steel Frame

Hyatt Roller Bearings are made in standard sizes and will also fit other frames than those shown.

HYATT BEARINGS

Not Invention," Says Edison

"Something in man makes him resist change. He clings to his old equipment and processes and habits rather than scrap them for something ten times more productive."

Today economical operation is more important than ever before. But human inertia causes men to cling to their old fashioned plain bearing transmission equipment although they know that economy cannot exist side by side with the waste caused by plain bearings.

It is time to overcome that inertia and replace your plain bearings with economical transmission equipment— Hyatt Roller Bearing Hangers. They will save you thousands of dollars each year. They economize on power—on oil—on maintenance.

By eliminating at least 50% of the dragging friction which makes plain bearings consume so much power Hyatt Roller Bearings will save 15% of your power. In addition to this they will save 80% of your oil and oiling labor, and 100% maintenance for the only attention they ever need is oiling three or four times a year.

Specify Hyatt Roller Bearing Hangers now — it's good economy — it's real common-sense.

E-185

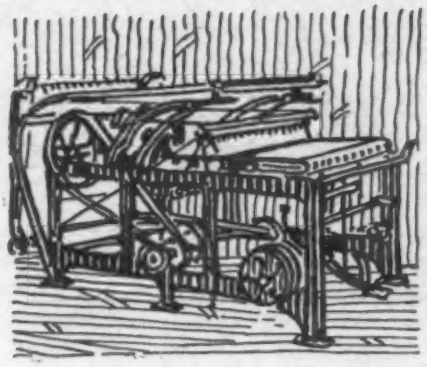
MOTOR BEARINGS DIVISION
DETROIT, MICH.

HYATT ROLLER BEARING COMPANY
INDUSTRIAL BEARINGS DIVISION
NEW YORK, N. Y.

TRACTOR BEARINGS DIVISION
CHICAGO, ILLINOIS

Manufacturers of Bearings for Mine Cars, Ore Cars, Steel Mill Cars, Roller Tables, Trolleys, Cranes, Hoists, Machine Tools, Line Shafts, Countershafts, Concrete Machinery, Textile Machinery, Conveyors, Lift Trucks, Industrial Trucks, Railway Service Cars, Storage Battery Locomotives, etc.

FOR LINE SHAFTS



The Place of HUMIDITY IN COTTON MANUFACTURING

No. 9. In the Cloth Room

In the Cloth Room, it is desirable to maintain a condition of approximately 8 1-2 per cent R for the same reason as in the finishing department in the Yarn Mill. An 8 1-2 per cent R represents about the condition of moisture that will hold in shipment of the finished product, and this represents humidities of about 60 per cent or 62 per cent. Under these conditions, the cloth will hold its weight.

No two mills are alike.

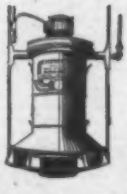
But characteristics of cotton and pounds manufactured are determinable.

With these as major premises, successful application of humidifying apparatus becomes not a matter of "almost so much," but follows exact law.

The object of humidifiers is after all nothing but one of regain; replacing in the fibre the moisture that nature originally provided that would otherwise be lost. The loss being yours if you don't.

All our approaches to your problem are based on this—with thousands of tabulations of data to establish exact law.

Profit by "High Duty Climate"



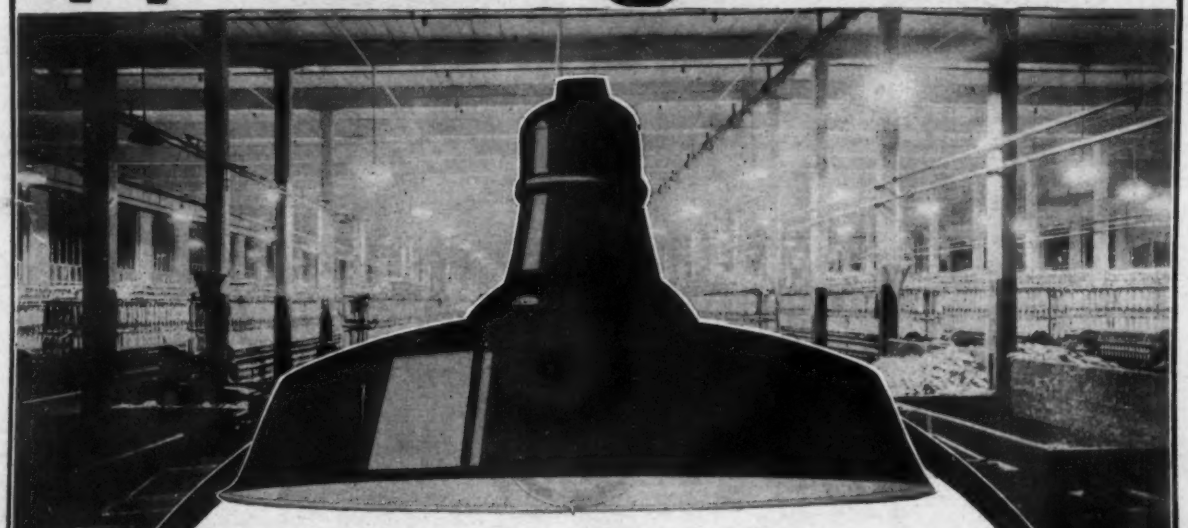
Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte

Westinghouse



Cutter Reflectors

Equipped with Westinghouse Mazda Lamps

Effect

Economies in Industrial Plants

Proper illumination is an aid to good workmanship. It increases the accuracy and speed of the worker; resulting in increased production and better quality, as well as a diminished scrap pile. Furthermore, it prevents injury to eyesight, and creates confidence, pride and contentment among your employees.

Cutter reflectors, equipped with Westinghouse Mazda Lamps, effect light intensities that measure up to the standard illumination necessary for every class of service in your factory.

There is a Cutter Standard Reflector of correct size and type for each department of your Factory.

If there is any doubt in your mind as to whether your lighting system is lacking in efficiency, you can settle this question definitely by the application of a Foot-Candle meter, which measures light just as accurately and simply as a thermometer measures temperature.

For further information write to—

Westinghouse Electric Mfg. Co.

GEORGE CUTTER WORKS

South Bend **Indiana**

W

WESTINGHOUSE ELECTRIC

"You are not only accomplishing great things throughout my plant, but you are making a new man out of me, the owner!"

said a nationally known executive about Sherman Service.

The object of Sherman Service is to increase the quality of production through the establishment of such ways and means as will be understandable, above-board and mutually profitable to employer and employee. We aim to change the viewpoints of our clients—employees and manufacturers as well. We deal solely with viewpoints. We work among the individuals which make up the plant, study their thoughts and acts. We find out the things that are contrary to contentful industrial effort and change these viewpoints into proper channels for production purposes.

For over ten years Sherman Service has been proving to employers its advantages until today you will find that beneath the surface of most every prosperous, smooth working, well managed plant there is or has been educational work done by Sherman Service.

Let us demonstrate in *your* mill the ability of Sherman Service to develop adequate instruction in industrial fundamentals and to make your present educational plans 100% effective throughout your mill.

Let us explain Sherman Service to you in plainer words. Tell your stenographer to drop us a line today on your business letterhead asking for chart and full data.

SHERMAN SERVICE INC.

Production Engineering
Industrial Co-ordination

New York
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Cleveland
Park Building
Pittsburgh
401 Wood St.

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Detroit
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New Haven
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St. Louis
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Toronto
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Montreal
Drummond Bldg.

Largest organization of its kind in the world.
Founded April 7, 1910.

SHERMAN SERVICE

"--a more satisfactory building at several thousand dollars less cost."

THE E.A. FONDA ORGANIZATION OF MASTER BUILDERS SERVICE

The following letter is one of many in our files and is just an indication of the reputation which we have among all of our clients:

"Mr. Fonda made possible the erection of our $100,000.00 Apartment House by effecting our financial arrangements, assisting our architect in redesigning the structural plan and producing for us a more satisfactory building at several thousand dollars less cost. Through his knowledge of effecting purchasing and working organizations he made additional savings to our personal observation which amounted to many thousand dollars. We found Mr. Fonda entirely trustworthy, dependable and a man who knows his line of work.

Mr. Fonda has directed several very large construction operations for some of my personal friends who all speak highly of his energy and ability. During the past year his operations in this vicinity went well past the million dollar column."

(Signed) D. L. MERIWETHER, Asheville, N. C.

Fonda Service is not an architectural service, nor is it merely a building service, but a construcitve service in which the whole heart and soul of the Fonda Organization is working—fighting to save you money and yet produce the most efficient and perfect construction that is humanly possible. And when the construction is turned over to you, you can feel sure that it could not be duplicated at a lower cost—and you will realize why **"Master Builders"** is a part of our name.

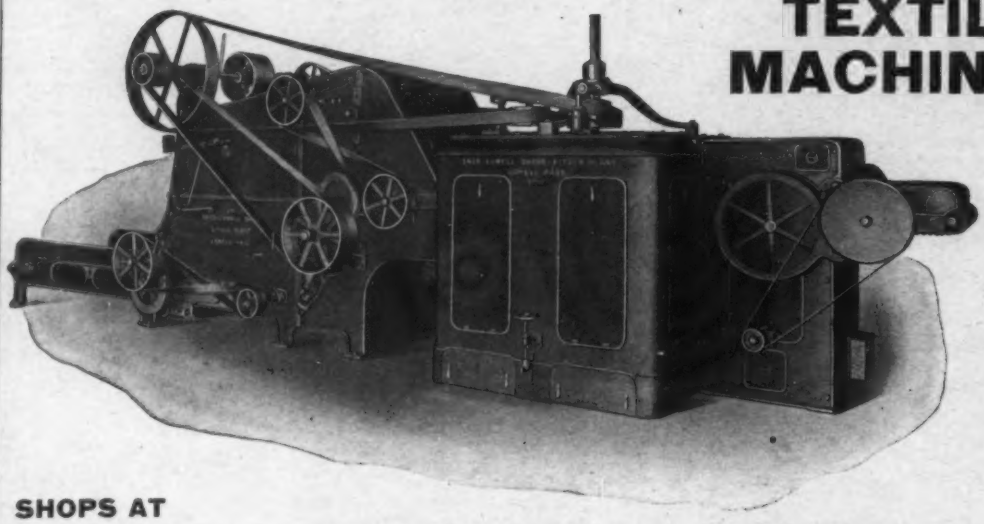
Full details of Fonda Service should be in your files for future reference. Estimates gladly furnished on any building or construction, no matter how large or how small. Write us today.

The E. A. FONDA ORGANIZATION of MASTER BUILDERS

GREENVILLE, S. C.
CHARLOTTE, N. C.

SACO-LOWELL SHOPS

TEXTILE MACHINERY



BALE BREAKER and VERTICAL OPENER with APRON DELIVERY

SHOPS AT

LOWELL, MASS. BIDDEFORD, ME. NEWTON UPPER FALLS, MASS.

Executive Offices, BOSTON, MASS.

ROGERS W. DAVIS, Southern Agent, CHARLOTTE, N. C. Southern Branch Office, GREENVILLE, S. C.

THE SIMPLEST AND THE MOST ELABORATE

FABRICS

Are produced on

LOOMS

From the

Crompton & Knowles Loom Works

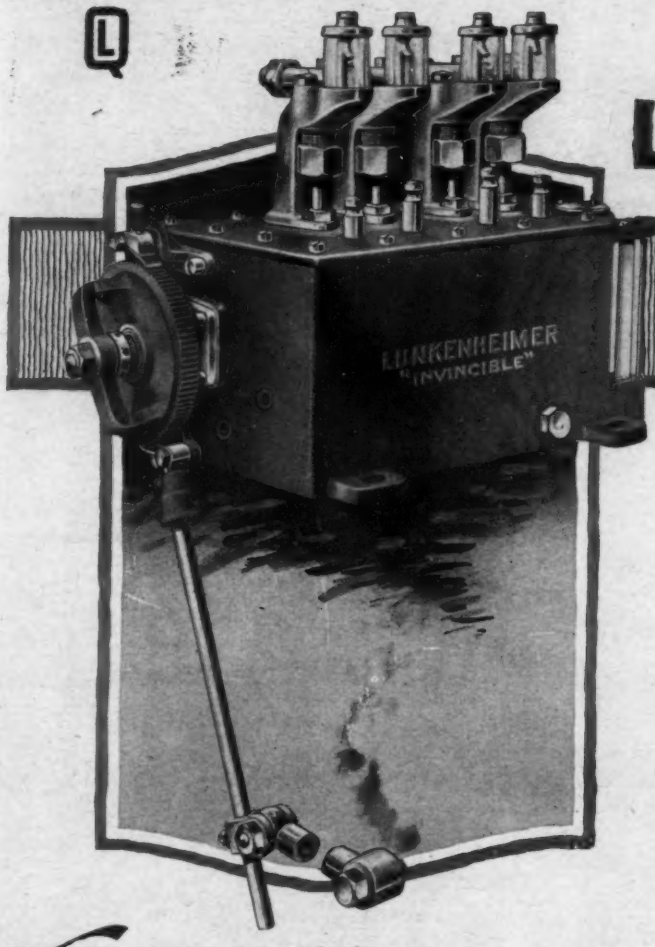
WORCESTER, MASS.

Providence, R. I. Paterson, N. J. Philadelphia, Pa.

Alexander & Garsed, Southern Representative, Charlotte, N. C.

LUNKENHEIMER

CYLINDER LUBRICATORS



AMERICA'S BEST
LUNKENHEIMER
"QUALITY"
SINCE 1862

For Steam and Oil Engine, Pump and Air Compressor Cylinders

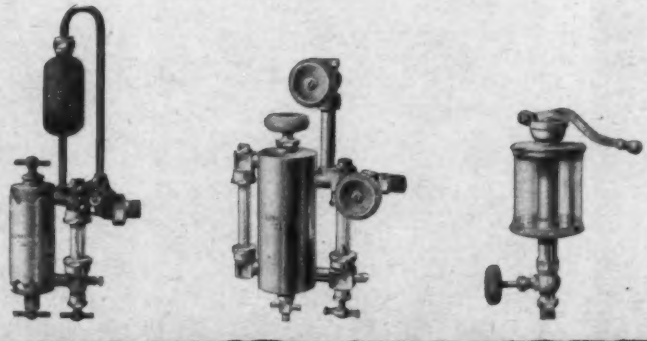
Dependable lubrication,—the delivery of the proper quantity of oil to the cylinders—is assured when power units are equipped with Lunkenheimer Cylinder Lubricators. They are positive in operation, delivering uniformly until reservoir is empty the exact quantity of oil for which the feed is set.

The feed regulation permits of close adjustment, the oil drops form perfectly and are clearly visible in the large sight-feeds. Lunkenheimer Cylinder Lubricators are made in a variety of types, including Hydrostatic, Hand and Mechanically operated,—practical in design, and durable because of the high quality materials used. All the parts are interchangeable and can be renewed should necessity require.

Equip with "LUNKENHEIMER" CYLINDER LUBRICATORS and satisfactory service is assured.

Write for descriptive booklets No. 526 — AK and 572 — AK

Their installation means permanence; their simplicity and durability—continuous service



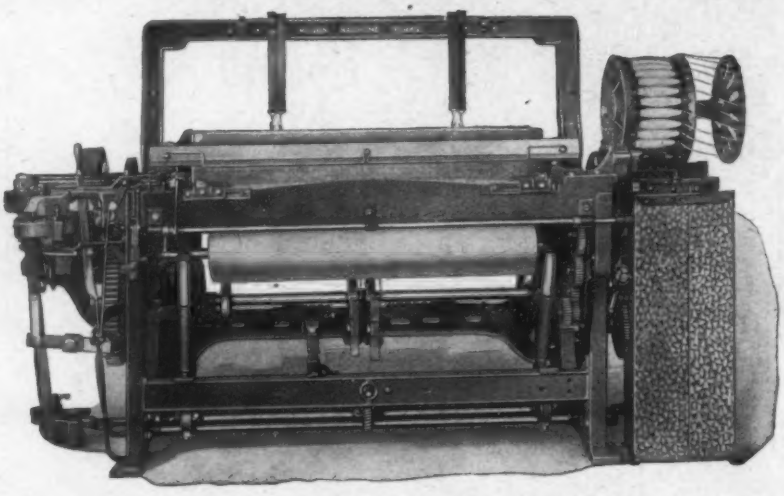
THE LUNKENHEIMER CO.
—"QUALITY"—

Largest Manufacturers of
High Grade Engineering Specialties
in the World

CINCINNATI

New York Chicago Boston London

Mason Automatic Loom



With Battery, Warp Stop Motion, Feeler and Shuttle Lock

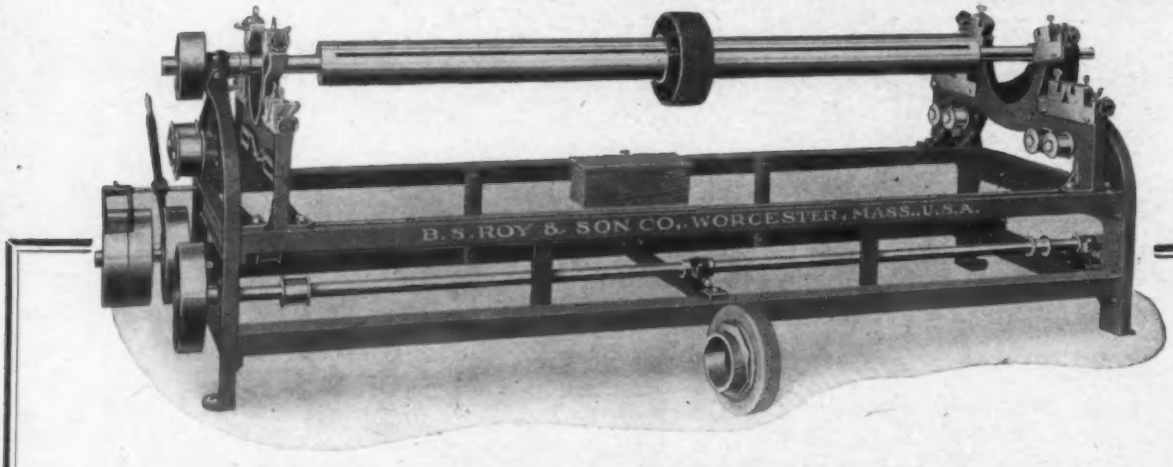
RANDOLPH CROMPTON'S PATENTS

Fewer Parts Standard Construction Rebounding Shuttles Overcome
Damage to Bobbins and Shuttles Prevented

We also build Revolving Flat Cards; Drawing Frames, Ring Spinning Frames; Duck Looms in various widths and weights; Silk Looms—Single Box and Two Box; Wide Sheeting Looms.

Mason Machine Works Co., Taunton, Mass.

E. HOWARD, Southern Agent, Greenville, S. C.



Superiority of Roy Grinders Proved By Comparsions

The Careful Buyer—the one who selects a machine only after investigating the merits of different makes, invariably chooses a "Roy" when in need of a grinding machine.

That they are the leading grinding machines made today is due to the many distinctive features that have been incorporated in them during our 50 years of manufacture.

WRITE FOR BULLETINS

B. S. ROY & SON CO., Worcester, Mass.

Established 1868

E. M. TERRYBERRY, Southern Agent, 1126 Healy Bldg., Atlanta, Ga.

GREIST

The improved Spinning Ring

Increased production and longer service as well as better service, are now made possible by the special features of Greist Spinning Rings.

They are made of special pressed steel, hardened to the extreme limit, with an exclusive "Superior Finish." Friction is reduced to the minimum, consequently saving wear on the traveler, eliminating the "breaking in" period and increasing speed to the maximum.

The curved, inclined flange gives greater clearance between it and the traveller for the yarn. The single flange has been adopted to conform with the modern trend of textile mills because double flange rings usually rust before they are turned over or cause confusion as to whether they have been turned or not. These are not idle statements but are the results of thorough tests made under actual mill conditions.

Greist Spinning Rings are the achievement of forty years of specialized mechanical work. As the foremost makers of Sewing Machine Attachments, in the world, our facilities for quality and quantity production are unsurpassed. Prompt delivery guaranteed. Make an actual test. Send for a sample.

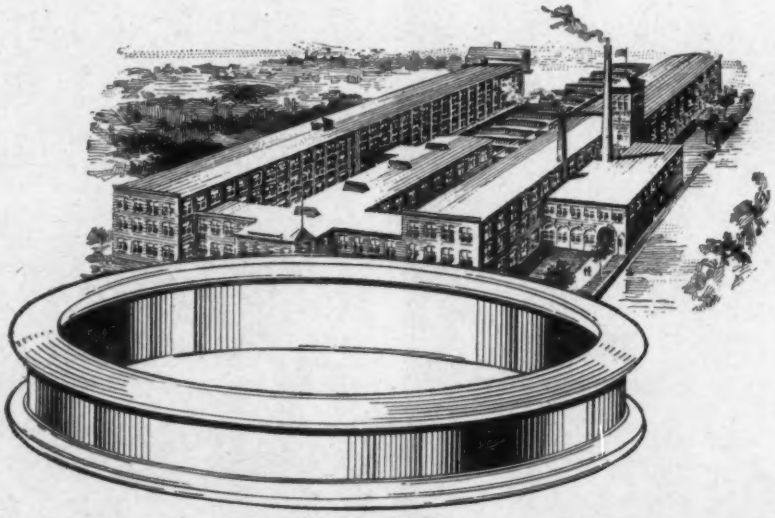
Also Greist Ring Holders

In standard types of design: Plate Holders (with Rust Resisting Finish), Cast Iron Holders, and Aluminum Holders.

New England Representative:
Boyd's Textile Bureau,
F. W. Boyd, Manager,
339 Butler Exchange,
Providence, R. I.

THE GREIST MANUFACTURING COMPANY
Dept. C.
NEW HAVEN, CONN.

Southern Representative.
G. G. Slaughter Machinery Co.,
Greenville, S. C.

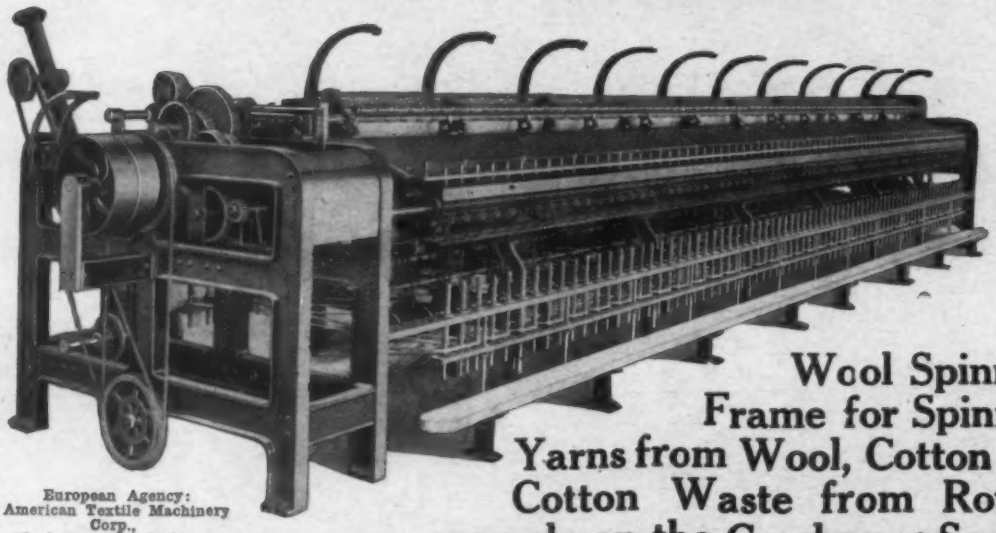


Patent Pending

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



European Agency:
American Textile Machinery Corp.,
47 Avenue De L'Opera,
Paris, France.

Wool Spinning Frame for Spinning Yarns from Wool, Cotton and Cotton Waste from Roving made on the Condenser System

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

Prices on Picker Sticks

It always pays to buy an article of quality, especially if that article has a direct bearing on mill production. Quality comes first, but price comes next. If you can get absolutely dependable Picker Sticks at good prices, that's the place to buy.

Our revised prices are very reasonable and our quality is guaranteed.

Southern Bending Co.

Johnson City, Tenn.

Constant Temperature 365 Days in the Year

You cannot afford to let your yarn lose weight in these days of high production costs. It is absolutely essential that constant temperature and humidity be maintained throughout your mill in every step—from opener picker to cloth baler. Outside weather conditions are too unreliable for even production, and those who watch profit and loss statements recognize the importance of maintaining even temperature and sufficiently high humidity day in and day out. Pick out the ideal climate for the interior of your mill and we will reproduce it 365 days in the year with a

Sturtevant Air Conditioning Systems

which will insure even weight from start to finish with the added advantages of eliminating static; of keeping the "fluff" out of the air, and of giving your employees healthy air to breathe.

B. F. Sturtevant Company, for over sixty years specialists in Putting Air to Work, are originators, leaders and largest producers in their field, which includes the production of Air-Conditioning Apparatus.

Together with the W. L. Fleischer engineering and construction organization we manufacture and install these systems. As "air specialists" and "doctors of climate" Sturtevant apparatus plus F. L. service will cure—economically and efficiently—all conditions of "sick" air. Scores of industrial plants have already benefited from the services of our "climate doctors." Manufacturing supremacy awaits now—the cotton manufacturer first to utilize this science in air conditioning.

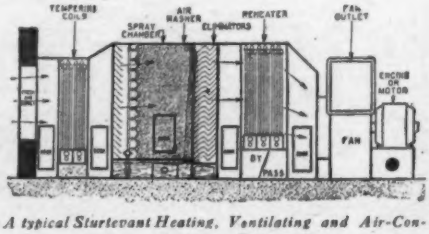
Send for the Booklet "Climate Doctors."

B. F. STURTEVANT COMPANY
HYDE PARK, BOSTON, MASSACHUSETTS

AND ALL PRINCIPAL CITIES.

This is the mark of W. L. Fleisher engineering and construction organization of New York, who join their expert field ability with the Sturtevant high standard of design and construction, and who guarantee to you satisfaction in the installation of air-conditioning systems.

Sturtevant Multivane Fan Used in Air-Conditioning Systems



A typical Sturtevant Heating, Ventilating and Air-Conditioning System

Howard Bros. Mfg. Co.

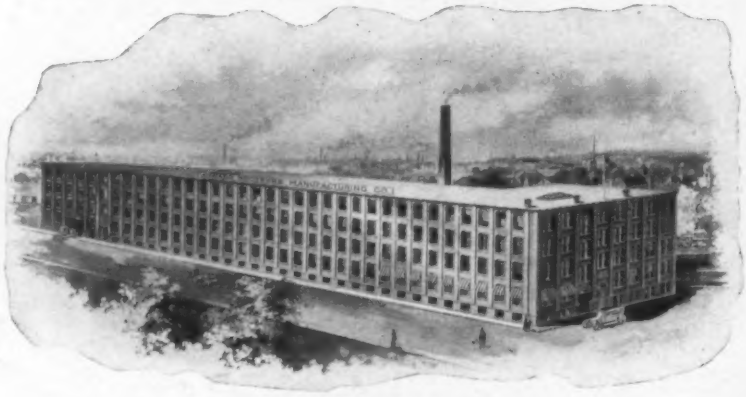
Established 1866

Atlanta, Ga. Worcester, Mass. Philadelphia, Pa.

CARD CLOTHING

Napper Clothing

Wire Heddles
Cylinder Fillets
Doffer Fillets
Top Flats Reclothed



Hand Stripping Cards
Stripper Fillets
Burnisher Fillets
Emery Fillets

Southern Agent

E. M. TERRYBERRY, 1126 Healey Building, ATLANTA, GA.

Shambow Shuttles

RE-INFORCED with Red Vulcanized Fibre will outwear the best plain wooden Shuttle two in one and increase loom production and maintain, if not actually improve, quality. They will prevent an end an hour per loom from going down. Figure this out in additional loom hours added to your present producing capacity.

We are Southern Distributors for the SHAMBOW SHUTTLE CO., of Woonsocket, R. I., and maintain in Atlanta a complete Service and Advisory Department, in charge of Mr. A. W. Angell, a direct Factory Representative, whose entire time is at the disposal of the Southern Textile Mills, to help reduce your Shuttle troubles to a minimum. Let us explain to you the advantages of using Shambow Fibre Re-inforced Shuttles and Picker Sticks.

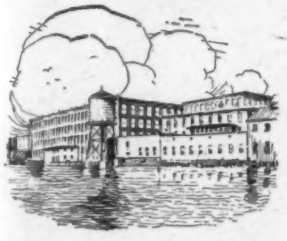
The **WALRAVEN** *Co.*

Machinery and Mill Supplies. ATLANTA, GA.

The Health Value of

CLEAN FLOORS

in American Business



Two of the Finnell-equipped mills of the AMERICAN THREAD COMPANY Holyoke, Mass. where CLEAN FLOORS contribute to the health of employes and the production of a CLEAN product.

Good health, the backbone of efficiency and happiness, depends upon cleanliness. Not only your living conditions, but your working conditions as well, determine the degree of health you enjoy.

Your food, your drink, your clothing, your home surroundings may be zealously guarded along sanitary lines; and yet—

What about that one-third of your time spent at work? Is your office CLEAN? Your store? Your factory?

You may think so. But look at the *floors!* If *they* are not CLEAN, your working conditions can not possibly be CLEAN.

The shuffle of feet, the whir of machines, the many other activities—all combine to circulate air laden with the dust and dirt loosened from mopped or hand-scrubbed floors.

The most progressive factories, mills, office buildings, stores, hotels, hospitals and a hundred other kinds of institutions now maintain *really* CLEAN FLOORS. With the Finnell System of Power Scrubbing, the only *thorough* method known, they now remove *all* the dirt from *any kind of floor*—from the very cracks, crevices and pores.

Write our Chicago offices for particulars

AMERICAN SCRUBBING EQUIPMENT CO.

Also manufacturers of Finola Scouring Powder

General Offices: 188 N. Wabash Ave., Chicago Factories: Hannibal, Mo.

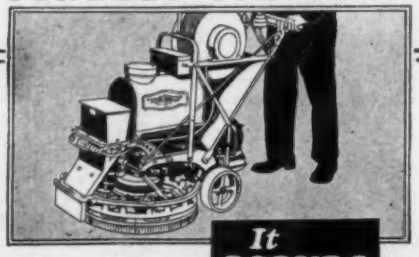
DISTRICT OFFICES

ATLANTA	BUFFALO	DENVER	LOS ANGELES	NEWARK	PHILADELPHIA	SALT LAKE CITY
BALTIMORE	CHICAGO	DETROIT	LOUISVILLE	NEW ORLEANS	PITTSBURGH	SAN FRANCISCO
BOSTON	CINCINNATI	INDIANAPOLIS	MILWAUKEE	NEW YORK	PROVIDENCE	SEATTLE
	CLEVELAND	KANSAS CITY	MINNEAPOLIS	OMAHA	ST. LOUIS	

FINNELL SYSTEM

OF POWER SCRUBBING

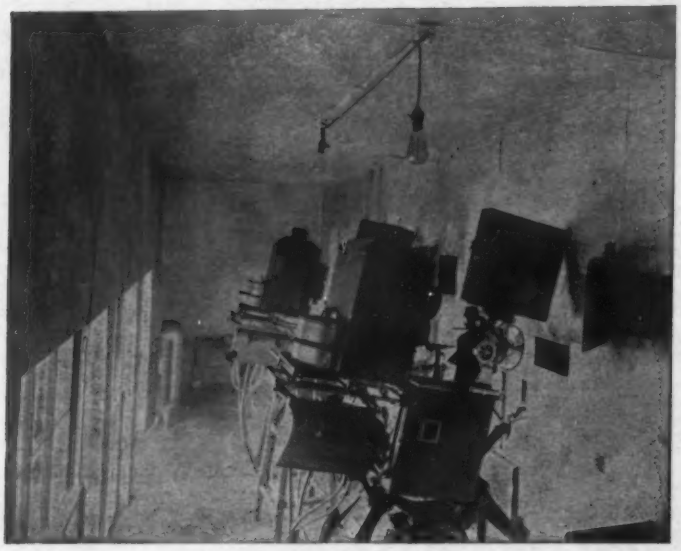
FINNELL SCRUBBER



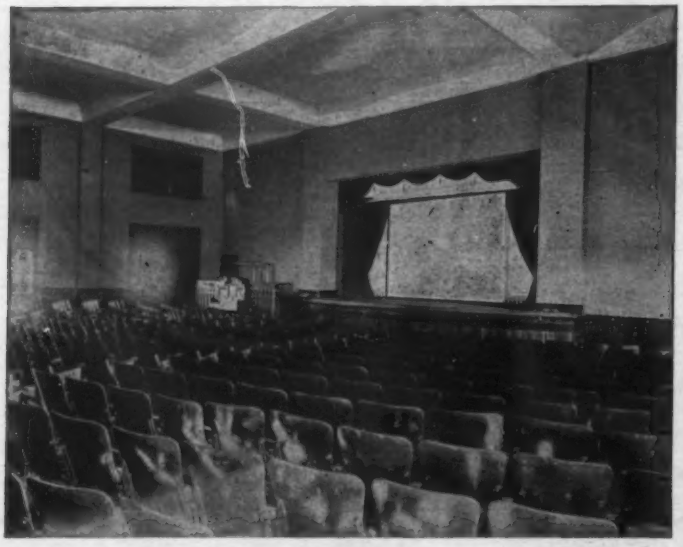
It SCRUBS *Electrically!*

"CLEAN FLOORS Reflect Clean Business"

Better Motion Pictures For Textile Mill Employees



Showing Installation of Power's 6 B Motion Picture Machines in the Tucupau Mills Theatre.



Showing Interior of Tucupau Mills Theatre, Tucupau, S. C.

THE textile industry is demanding the best moving pictures for their employees, and that is why more

POWER'S PROJECTORS

are used by textile mills in the South than all other projectors combined.

Here Are a Few of the Mills Using Power's

Exposition Cotton Mill	Atlanta, Ga.
Bibb Manufacturing Co.	Columbus, Ga.
Bibb Manufacturing Co.	Porterdale, Ga.
Gainesville Cotton Mill	Gainesville, Ga.
Habersham Mill	Habersham, Ga.
Hillside Cotton Mill	LaGrange, Ga.
Manchester Mill	Manchester, Ga.
Milstead Mill	Conyers, Ga.
Thomaston Cotton Mill	Thomaston, Ga.
Roswell Manufacturing Co.	Roswell, Ga.
Trion Company	Trion, Ga.
Rocky Mount Cotton Mill	Rocky Mount, N. C.
Bodman-Heath Cotton Mill	Waxhaw, N. C.
Pomona Mills	Greensboro, N. C.
Cleveland Mill & Power Co.	Lawndale, N. C.
Spray Cotton & Woolen Mills	Spray, N. C.
Issaqueena Mills	Central, S. C.
D. E. Converse Co.	Glendale, S. C.
Monoghan Mills	Greenville, S. C.
Woodside Mills	Greenville, S. C.
Pacolet Manufacturing Co.	Pacolet, S. C.
Tucupau Mills	Tucupau, S. C.
Victor Mills	Greer, S. C.
Victor-Monoghan Mills	Seneca, S. C.
Victor-Monoghan Mills	Walhalla, S. C.
Victor-Monoghan Mills	Jonesville, S. C.
Ware Shoals Manufacturing Co.	Ware Shoals, S. C.
Glenn-Lowry Manufacturing Co.	Whitmire, S. C.
Lanett Mills	Lanett, Ala.
Indian Head Mills	Cordova, Ala.
Selma Manufacturing Co.	Selma, Ala.
Central Mills	Sylacauga, Ala.
Tallahassee Falls Manufacturing	Tallahassee, Ala.

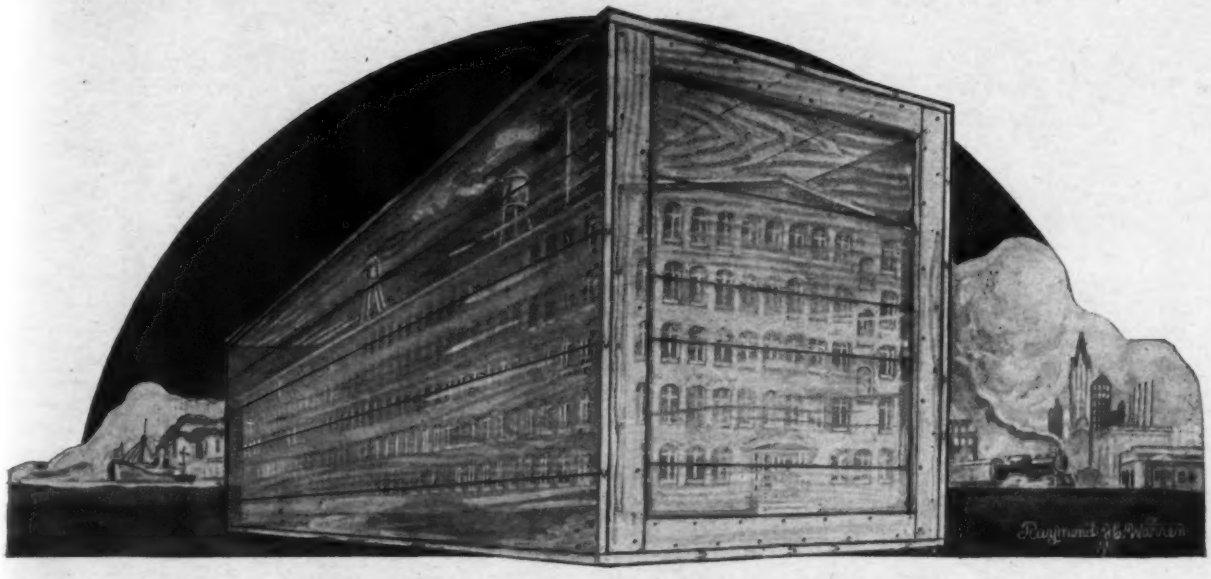
Our experience in Theatre Equipment is at your service

"WE HAVE A SPECIAL OFFER"

Southern Theatre Equipment Company

No. Nine Nassau St.
ATLANTA, GEORGIA

Eighteen Fifteen Main St.
DALLAS, TEXAS



Ship in the Wood Box
—all the products of your Mill

PRODUCTS of a textile mill are valuable. Easily damaged, they need complete protection in storage and in transit.

Good Wood Boxes are strong and dependable. They insure safe delivery of your product to Satisfied Customers.

Whether your shipments are heavy or light, bulky or compact, a wood box may be designed to fit your particular need.

Good Wood Boxes are built by the members of the National Association of Box Manufacturers.

Send for our illustrated Manual on Wooden Box and Crate Construction—practical—complete—authoritative. : : :

200 pages—$3.50

Good Wood Boxes

Backed by the National Association of Box Manufacturers

GENERAL OFFICES
1553 CONWAY BUILDING, CHICAGO

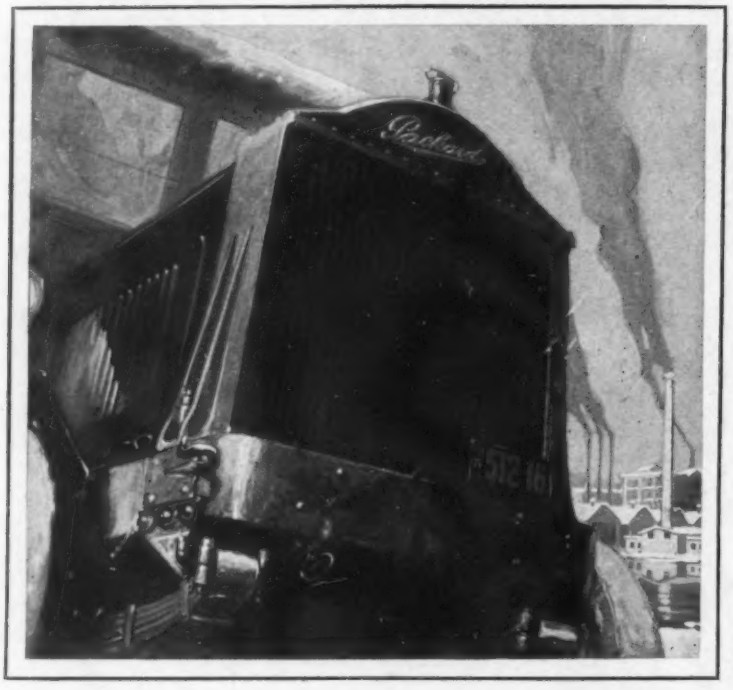
New England:
1013 SCOLLAY BLDG.,
Boston, Mass.

New York:
17 WEST 46th STREET
New York, N. Y.

Eastern:
433 CALVERT BLDG.,
Baltimore, Md.

Southeastern:
210 WALTON BLDG.
Atlanta, Ga.

PACKARD



Used Two Years, Replacement Cost $1.20

Its capacity for uninterrupted work, at a minimum cost for operation and upkeep, gives to the Packard truck a preferred place in the hauling records of the textile industry.

This ability to serve its owners profitably is a direct result of the tested design, selected materials and expert workmanship that enter into Packard manufacture, and of the method by which every Packard truck is specified to its particular job.

An example of Packard economy is shown in the record of a Packard truck in the service of the Irene Mills, Gaffney, South Carolina. This Packard, used practically every day since 1918, has cost but $1.20 for replacements.

Every Packard truck has the benefit of the country-wide service facilities established to keep the Packard truck at the highest possible level of efficiency.

PACKARD MOTOR CAR COMPANY · DETROIT

Ask the man who owns one

COCHECO

BELTING

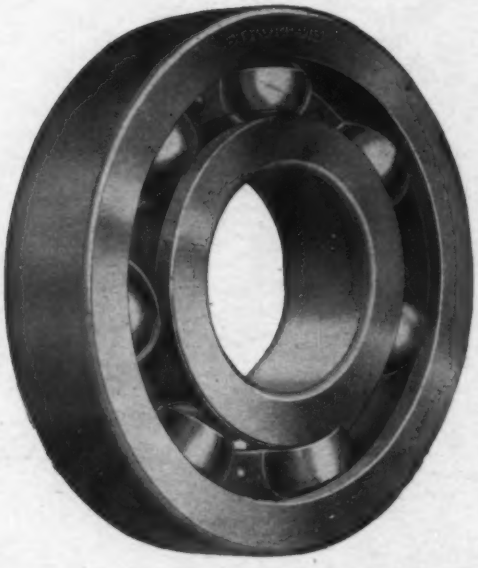
Have you discovered the way to put quality into your product without paying for it? We haven't! We have found the more care we give the production of Cocheco Belting, the more it costs us to manufacture. It is possible to beat us some on price—we ourselves could make a cheaper belt if we so desired—but no cheaper belt can be "just as good" as Cocheco. We started making quality belts back in '42, and have kept faithful step with progress ever since. We are convinced that belting of real super-quality costs real money to make—always has and always will. For the same reason, it is not low priced. *"Cheaper in the long run is just another way of saying Cocheco Quality.*

We will be glad to send you a list of firms who bought Cochecos 20 to 30 years ago and are using the identical belts today.

I. B. WILLIAMS & SONS

Dover, New Hampshire

BOSTON, MASS.	157 Summer Street
NEW YORK, N. Y.	71-73 Murray Street
CHICAGO, ILL.	14-16 N. Franklin Street



NOW IS THE TIME TO IMPROVE YOUR EQUIPMENT

You can insure continuous production and a quality product by the use of Strom bearings in textile machinery.

With their extra large balls and deep-grooved raceways, these bearings have the durability to withstand unusually hard service.

They reduce friction to a minimum, save power and oil, and enable the operator to obtain maximum production.

Complete equipment for any textile installation may be obtained through the Aldrich Machine Works, Greenwood, S. C.

Radial bearings made in a wide range of sizes for light, medium and heavy duty. Angular contact bearings especially designed to support combinations of radial and heavy end thrust loads. Thrust bearings made in all types and sizes with flat and grooved races.

U. S. Ball Bearing Mfg. Co.
(Conrad Patent License)
4544 Palmer St., Chicago, Illinois.

82

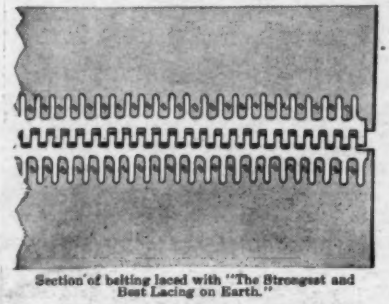
Strom BEARINGS

Why Good Belts Often Fail In Ordinary Service

Purchasing Department Often Wrongly Criticised

The buying of a belt generally receives the most serious consideration from the up-to-the-minute purchasing department, especially as there are so many kinds and types to choose from, each having its own definite claim to distinction.

However, as it is generally pretty well known just what belts will

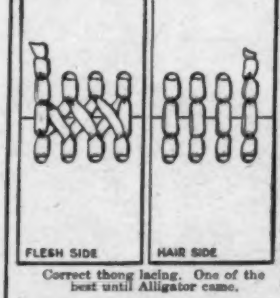


Section of belting laced with "The Strongest and Best Lacing on Earth."

give better service than any other under certain working conditions, the matter frequently becomes only a question of H. P.'s, diameter, revolution, distances, position, etc. With this covered, too often belts and the ones who bought them receive censure.

Belt Lacing Important As Belt Buying

One would think that with the right belt finally on the pulleys, there would be easy, uneventful sailing ahead. Often it is—oftener perhaps, not. It is neither the fault of the belt nor the buyer — not once in a thousand times, when the belt gets out of shape, begins to act skittish and run wild, and finally falls off useless.



Correct thong lacing. One of the best until Alligator came.

Do Not Depend Too Strongly On Rawhide Lacing

A neat job of rawhide lacing may only be the cause of chronic belt ailment. Appearances are deceptive, as a first-class looking job often proves in practice. Stretching, twisting, wobbling and "jumping" at the pulleys are only a few of the charges against it.

ALLIGATOR Steel Belt Lacing is Good All the Way Through

ALLIGATOR is made along simple practical lines, for any belt service — and it stays "put." Its double staggered teeth grip like an Alligator—and never lets go, once it has secured a hold. And ALLIGATOR Steel Lacing makes a perfect joint. These are the reasons of its wonderful popularity and universal usage throughout the industrial world.

Another feature is that the ALLIGATOR laced belt joint does not jump the pulleys and does not allow the belt to twist or run crooked. It is flexible and hugs the pulleys. It can be run with both surfaces in contact with the pulleys. The steel rocker hinge pin insures frictionless operation of the joint.

Pull Comes on Edge of Teeth —Not on Flat Side

Note that the ALLIGATOR teeth clinch through the belt **edgewise to the pull** and therefore cannot injure or cut the lengthwise fibers which support the pull. This is one big reason why ALLIGATOR laced joints last longest.

"Nothing Needed But a Hammer"

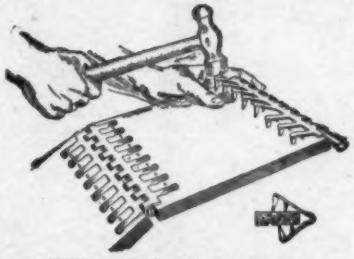
Actual size of No. 2E Alligator for single leather or 4-ply fabric 3-16 to 9-32 thick. Note double staggered teeth.

Aside from its other superiorities, so simple is ALLIGATOR Steel Belt Lacing, so easy is it to attach, that only a hammer is needed from first to last to make a perfect joint. No machinery needed here. No long processes consuming time and labor. Ordinary intelligence and a hammer can do the trick in three minutes. And the job won't go wrong next day. It stays "put."

Most Belt Users for Alligator

Judging from the quantities ordered and in use in the industrial world today, ALLIGATOR has the preference over all other types of belt lacings. Many who would like to use it are tied up by rulings of purchasing departments and individuals who have not quite reached the full understanding that ALLIGATOR will work on

Rocker pin makes possible the use of a hinge belt joint in damp places and under heavy loads where a rawhide pin will not stand up.



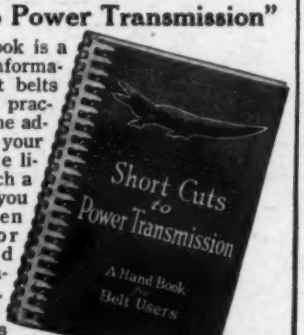
Nothing needed but a hammer to apply it—and you already have a hammer.

all belts from tape size, up to the giant conveyors with their crushing loads.

ALLIGATOR has been proven, indisputably, the most economical, practical and serviceable of all belt lacings. Many big belt makers have even gone on record as recommending it for their own belts to make certain of their products' lasting longer.

Write for Free Book—"Short Cuts to Power Transmission"

This book is a mine of information about belts and belt practice. A fine addition to your reference library. Such a book as you have often needed for simplified authoritative data. Now used in numbers of Technical Colleges and by thousands of engineers and practical belting men.



If specially interested in ALLIGATOR Steel Belt Lacing, fill out and mail form below.

Reg. U. S. Pat. Off.

Flexible Steel Lacing Co.
4619 Lexington St., Chicago
135 Finsbury Pavement, E. C., London

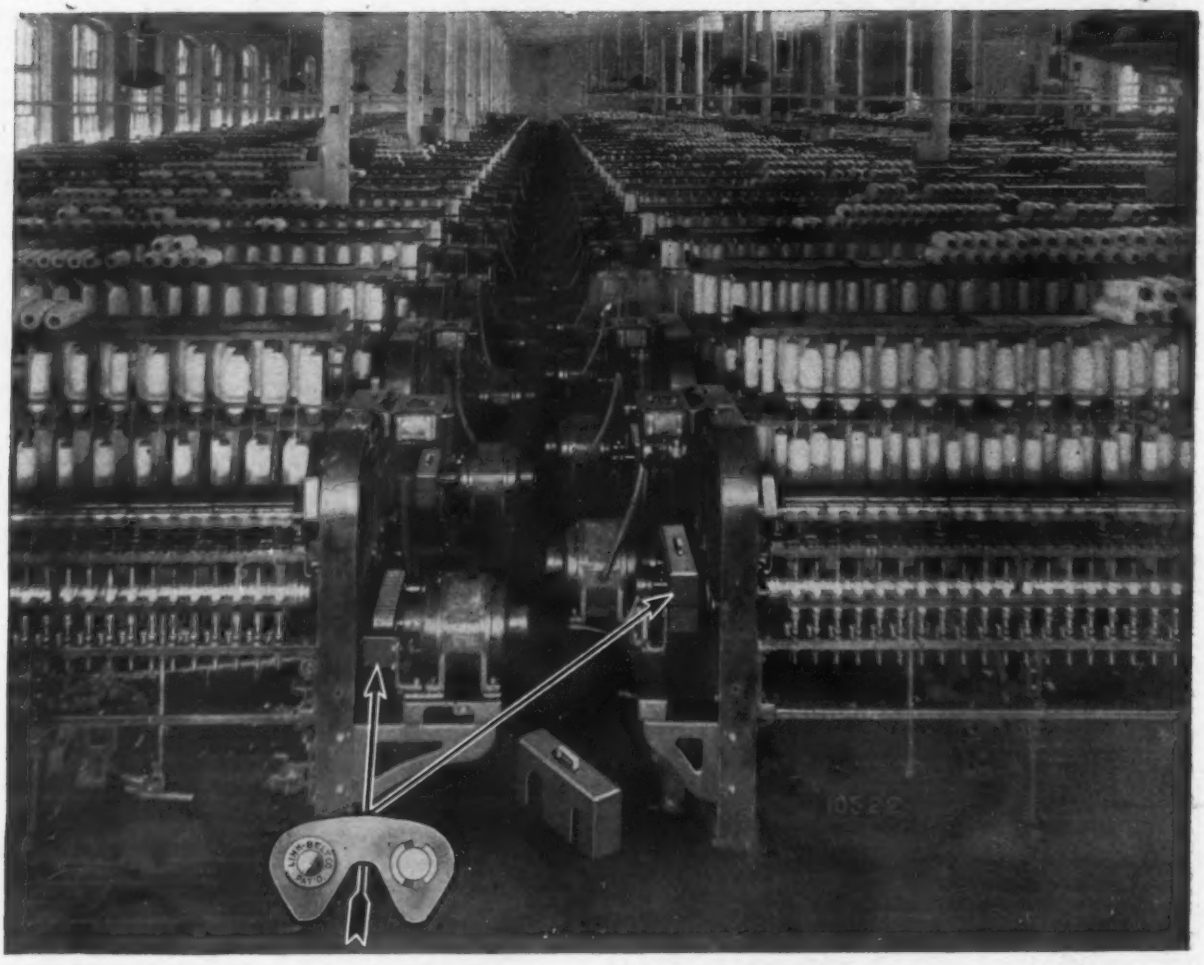
Flexible Steel Lacing Co.,
4619 Lexington Street., Chicago.

Gentlemen: Without obligation, kindly send me price lists and complete details on Alligator Steel Belt Lacing and indicate a convenient source of supply. Also send your book, "Short Cuts to Power Transmission."

Firm Name.....

Address.....

Name of Inquirer.....



Efficient Power Transmission

THE selection of the correct power transmission for the varied types of machinery used in Textile Mills today should be accorded the same careful thought that is given to the manufacture of the product of the mill.

When investigations are made Link-Belt Silent Chain Drives are usually selected because Link-Belt Silent Chain combines the best points of the leather belt with the positive action of gears, minus their disadvantages.

Upon the power transmitting medium depends not only a saving or a waste of power, but, what is more important, an increase or decrease in the production. Also a uniformly perfect product results from the use of a uniformly smooth-running drive. Therefore, give this subject—the selection of the proper driving medium—the attention it deserves.

The day has passed when anyone can afford to waste power (money), or fail to adopt modern methods which mean "safety-first", and an increase in production—equipment such as the Link-Belt Silent Chain Drive, which requires minimum attention and gives such reliable, efficient service.

Let one of our experienced power transmission engineers call on you and explain the effectiveness of transmitting power to your machines with the Link-Belt Silent Chain Drive.

Write for 128 page price list Data Book No. 125.

LINK-BELT COMPANY

512

PHILADELPHIA

Atlanta, Ga.—707 Citizens and Southern Bank Bldg.

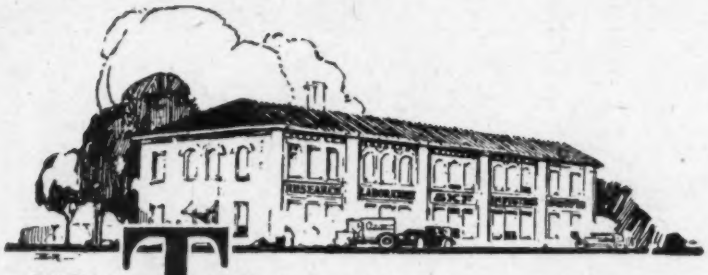
CHICAGO

Charlotte, N. C.—J. S. Cothran, Com'l Bank Bldg.

INDIANAPOLIS

Birmingham, Ala.—S. L. Morrow, 720 Brown-Marx Bldg.

LINK-BELT
SILENT CHAIN DRIVES



SKF
Research Laboratory established at Philadelphia to co-operate with the Gothenburg Laboratories in the study of the American Manufacturers' friction problems.

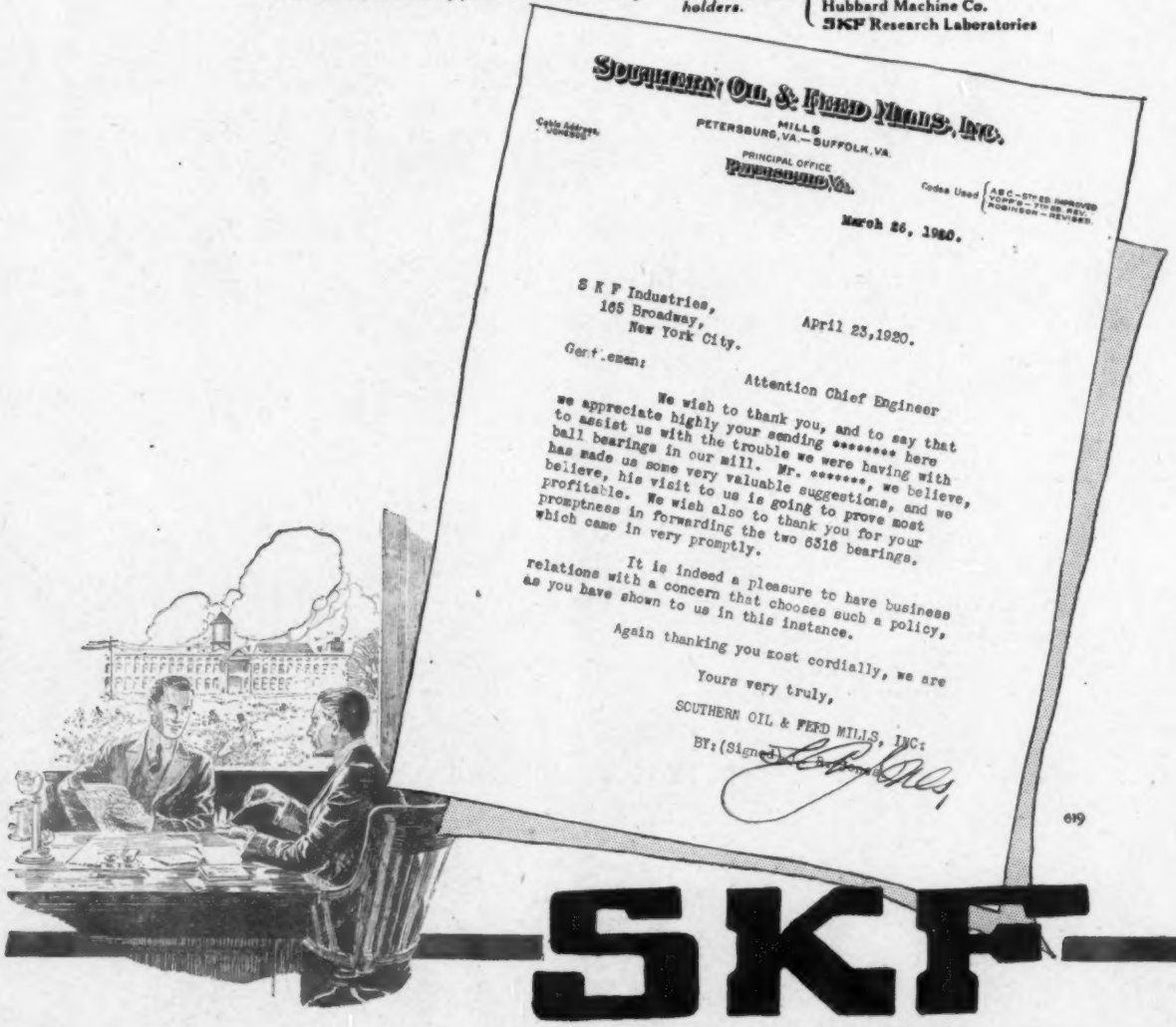
THE technical advice brought you by our engineers embodies the experience of highly trained organizations in all parts of the world in the solving of friction problems.

This international experience is both technical and practical and is acquired in co-effort with the best international research endeavor.

SKF service in America is linked to this international experience. Its tangible evidence is found in products marked "**SKF**" and in the advice supplied you by our engineers.

SKF Industries, Inc.
165 Broadway, New York City

Supervising at the request of the stockholders.
- The Hess-Bright Manufacturing Co.
- SKF Ball Bearing Co.
- Atlas Ball Co.
- Hubbard Machine Co.
- SKF Research Laboratories



SOUTHERN OIL & FEED MILLS, INC.

MILLS
PETERSBURG, VA. — SUFFOLK, VA.

PRINCIPAL OFFICE
PETERSBURG, VA.

March 26, 1920.

S K F Industries,
165 Broadway,
New York City.

April 23,1920.

Gent.emen:

Attention Chief Engineer

We wish to thank you, and to say that we appreciate highly your sending ******* here to assist us with the trouble we were having with ball bearings in our mill. Mr. ******, we believe, has made us some very valuable suggestions, and we believe, his visit to us is going to prove most profitable. We wish also to thank you for your promptness in forwarding the two 6316 bearings, which came in very promptly.

It is indeed a pleasure to have business relations with a concern that chooses such a policy, as you have shown to us in this instance.

Again thanking you most cordially, we are

Yours very truly,

SOUTHERN OIL & FEED MILLS, INC:

BY:(Signed)

619

SKF

Among these products now offered are:

Single row deep groove ball bearings. Thrust bearings. Steel balls.
Double row self aligning ball bearings. Transmission equipment.

ADVERTISING

By DR. FRANK CRANE

(Copyright by Frank Crane)

ADVERTISING is the greatest business in the world. That is not because it enables business people to sell more goods, not because it is a way to make great profits. Nothing can be really great for any purely dollars-and-cents reason.

It is because, in advertising, business becomes vocal. When, in the course of evolution, the animal acquired speech and became able to utter himself, he had made the longest stride in development. He had stepped from brute to man.

The human soul dates back to the first word. "In the beginning was the Word."

Advertisement is the utterance of human energy. Craftmanship is good, and industry, and organization, and business ability; but they are dumb giants until they find speech—dumb and dangerous.

Business, including manufacturing, farming, transportation, and selling is to the new world what fighting was to the old. The old world organized only to kill, and its genius was displayed by great generals. Its heroes were the mighty killers. To them it set up its statues.

The new world, typified by, led by America, is organized to serve, to make human life richer, deeper, stronger, more complex and heterogeneous.

And business is simply service. Business comes to itself, attains maturity and full self-expression only through advertising.

Advertising is the breath of life breathed into the nostrils of business, by which it becomes a living soul.

Thus advertising not only enlarges business; it radically changes the nature of business.

By it business passes from bureaucracy and autocracy into democracy. It takes the whole people into its growth. It enters the veins of the commonwealth. It becomes a function of communal life.

Without advertising comes decay and death.

Nations need advertising. If they would advertise they would prevent war. War is the self-expression of dumb brute force.

Advertising is the self-expression of intelligent strength that knows how to speak.

It is the something plus in advertising that is significant. It is this something plus that makes advertising to business what art is to handiwork, what music is to feeling, what language is to the soul.

LIST OF MEMBERS

Each has subscribed to and is maintaining the highest standards or practice in their editorial and advertising service.

Advertising and Selling
American Architect
American Blacksmith
American Exporter
American Funeral Director
American Hatter
American Machinist
American Paint Journal
American Paint and Oil Dealer
American Printer
American School Board Journal
Architectural Record
Automobile Dealer and Repairer
Automobile Journal
Automotive Industries
Bakers Weekly
Boiler Maker
Boot and Shoe Recorder
Brick and Clay Record
Buildings and Building Management
Building Supply News
Bulletin of Pharmacy
Canadian Grocer
Canadian Railway & Marine World
Candy and Ice Cream
Chemical & Metallurgical Engineering
Clothier and Furnisher
Coal Age
Coal Trade Journal
Concrete
COTTON
Daily Metal Trade
Distribution and Warehousing
Domestic Engineering
Dry Goods Economist
Drygoodsman
Dry Goods Reporter
Electric Railway Journal
Electrical Merchandising
Electrical Record
Electrical World
Embalmers' Monthly
Engineering and Contracting
Engineering and Mining Journal
Engineering News-Record
Factory
Farm Implement News
Farm Machinery—Farm Power
Fire and Water Engineering
Foundry (The)
Furniture Journal
Furniture Manufacturer and Artisan
Furniture Merchants' Trade Journal
Gas Age
Gas Record
Grand Rapids Furniture Record
Haberdasher
Hardware Age
Heating and Ventilating Magazine
Hide and Leather
Hospital Management
Hotel Monthly
Illustrated Milliner
Implement and Tractor Age
Implement & Tractor Trade Journal
Industrial Arts Magazine
Inland Printer
Iron Age
Iron Trade Review
Lumber
Lumber Trade Journal
Lumber World Review
Manufacturers' Record
Manufacturing Jeweler
Marine Engineering
Marine Review
Millinery Trade Review
Mill Supplies
Mining and Scientific Press
Modern Hospital
Motor Age
Motorcycle and Bicycle Illustrated
Motor Truck
Motor World
National Builder
National Druggist
National Petroleum News
Nautical Gazette
Northwest Commercial Bulletin
Northwestern Druggist
Nugent's, The Garment Weekly
Oil News
Oil Trade Journal
Plumber and Steam Fitter
Power
Power Boating
Power Farming Dealer
Power Plant Engineering
Price Current—Grain Reporter
Printers' Ink
Railway Age
Railway Electrical Engineer
Railway Maintenance Engineer
Railway Mechanical Engineer
Railway Signal Engineer
Retail Lumberman
Rubber Age and Tire News
Shoe Findings
Shoe and Leather Reporter
Shoe Retailer
SOUTHERN ENGINEER
SOUTHERN HARDWARE & IMPLEMENT JOURNAL
Sporting Goods Dealer
Starchroom Laundry Journal
Tea and Coffee Trade Journal
Textile World Journal
Welding Engineer
Woodworker

THE ASSOCIATED BUSINESS PAPERS, INCORPORATED

HEADQUARTERS - - - - - 220 WEST 42nd STREET - - - - - NEW YORK

The Most Successful Cotton Mills are those

best equipped to "carry on" in their particular line of endeavor.

And you will usually find them equipped with the

T. B. WOOD SONS CO.

Line of Power Transmission Machinery

SHAFTING
COUPLINGS
SET COLLARS
: PULLEYS :
: HANGERS :
FRICTION :
: CLUTCHES

BASE PLATES
FLOOR STANDS
PILLOW BLOCKS
WALL BRACKETS
ROPE SHEAVES
BELT . . . . . .
TIGHTENERS

T. B. WOOD'S SONS CO., Chambersburg, Pa.

MILTON G. SMITH, SOUTHERN SALES AGENT, GREENVILLE, S. C.

The End of a Difficult Problem

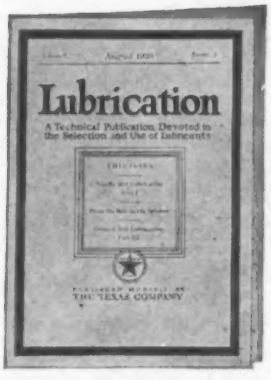
For a long time in a large number of mills, the successful lubrication of comb boxes has been a difficult problem. And for a peculiar reason.

And this was largely because so many textile mill engineers have been content to follow the custom—or the habit—of using a heavy lubricant in the boxes.

There was no real reason for this and we have demonstrated this conclusively with Texaco Comb Box Lubricant.

Now, as you know, a comb box contains an eccentric, and on some types of comb boxes, there are two, driving the comber shaft at a speed of 1500 to 2200 r.p.m.—a combined sliding and rotating movement.

These eccentrics run in a bath of lubricant and as the comb is usually set within 0.005 inches of the doffer cylinder, it is absolutely essential that the comb box, within which the eccentrics are located, be kept at an even temperature to maintain the exact adjustment of the comb from the doffer cylinder and the even running of the sliver. It is only by maintaining this distance exactly that the sliver runs even.



In this magazine we print month after month, articles covering the problems of lubrication as applied to various industries.

These articles are not theoretical, but based on practical operating experience.

We shall send "Lubrication" to Engineers, Executives, Buyers of Lubricants and others, who are professionally interested and who ask for it—FREE—for the time being. Write for it.

TEXACO COMB BOX LUBRICANT

shows what can be accomplished by engineers who are not content to follow the beaten path

Texaco Comb Box Lubricant is made especially for the purpose and meets operating conditions perfectly. It brings with it the freedom from mechanical difficulties in the comb box and because of its long life, is exceptionally economical.

Texaco Comb Box Lubricant is different from other products offered for sale or now in use, and to prove conclusively that it is adequate for the work, we have only to cite two points:

1. **One filling of Texaco Comb Box Lubricant lasts two or three times as long as the other kinds.**
2. **In every case we have shown that with Texaco Comb Box Lubricant there is a considerable reduction in frictional temperature in the box. Sometimes this difference exceeds 15 degrees.**

There is a Texaco Lubricant for Every Purpose

Other Texaco Textile Mill Lubricants are:

Texaco Loom Oil, Texaco Rabtex Spindle Oil, Texaco Top Roll Lubricant, Texaco Engine Oils, Texaco Machine Oils, Texaco Turbine Oils, Texaco Cylinder Oils, Texaco Gear Lubricants.

THE TEXAS COMPANY

Dept., O, 17 Battery Place, New York City, N. Y.

Atlanta Houston Chicago

OFFICES IN PRINCIPAL CITIES.

The time-tested bearing is always the safe bearing

The three primary requisites of a good bearing are:

1st—A proper bearing area.
2nd—Good babbitt.
3rd—A positive method of lubrication.

Upon these points depends whether or not the bearing in your plant will last two years or twenty.

Dodge self-oiling bearings are five times as long as the diameter of the shaft they carry—Dodge bearing metal is the final result of thirty years' experiment to find the best.

The self-oiling feature is positive—lubrication by capillary attraction is as unfailing as the law of physics which governs the application.

Dodge bearings are built for long, hard service; when shafts are properly aligned and installed they constitute the most economical and least troublesome "roadbed for power" possible.

The capillary bearing is self-acting and needs but one filling of oil in each six months. Only clean oil reaches the shaft. The normal depreciation of this frictionless bearing will not exceed 2% per year. Can you find another lineshaft bearing that may boast as low an upkeep cost?

DODGE

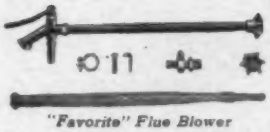
Power Transmission Machinery

Dodge Sales & Engineering Company, distributor of the products of the Dodge Manufacturing Company and the Dodge Steel Pulley Corporation. General Offices: Mishawaka, Ind. Works: Mishawaka, Ind., and Oneida, N. Y.
Canadian Plant: Dodge Mfg. Co. of Canada Ltd., Toronto and Montreal

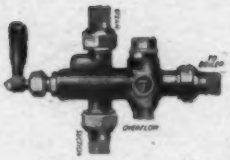
Philadelphia Cincinnati New York Chicago St. Louis Boston Atlanta Pittsburgh Minneapolis Dallas Providence Seattle Newark

"Eagle" Ejector

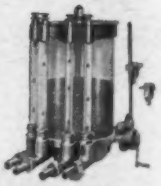
"Sherwood" Double Tube Injector



"Favorite" Flue Blower



"Buffalo Automatic" Injector



"Hart" Oil Pump

"Buffalo" Glass Body Cylinder Oil Pump

"Felthousen" Hand Oil Pump
Capacities, ¼ to 3 pints, brass or glass body

"Sherwood" Grease Cup

Have you received a copy of the Sherwood Book? It is well worth reading.

Write your name and address on the margin of this page. Forward it to us, and we will send the Sherwood Book to you by return mail.

Standardize On Sherwood

No matter whether you require a grease cup, an oil pump, an ejector or flue blower you can rest assured that it is correct in design—faultless in construction—built with out-of-ordinary features which assure dependable, economical operation—if it bears the Sherwood name.

For more than a quarter century Sherwood Engineering Specialties have been standard in the power plant field. They have proven their worth in service under most rigorous conditions.

And today hundreds of engineers are standardizing on Sherwood.

Insure the economical operation of your power plant by demanding Sherwood Steam Specialties. They are carried in stock by leading jobbers and dealers.

SHERWOOD MANUFACTURING COMPANY
BRASS FOUNDERS AND FINISHERS
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BUFFALO, N. Y.

(5)

"Sherwood" Screw Feed Grease Cup

"Felthousen" Glass Body Hand Cylinder Oil Pump

Gravity Oil Cup

"Niagara" Plain Grease Cup

Sight-Feed Oil Cup

SHERWOOD
ENGINEERING-SPECIALTIES

NON-FLUID OIL

You can't fool a card

Only the best lubrication will

maintain accurate alignment by preventing worn bearings

avoid spoiling of card clothing

keep comb boxes well lubricated

there's one lubricant that can do all this, and that is

TRADE MARK REGISTERED IN

NON-FLUID OIL

UNITED STATES PATENT OFFICE

Modern Textile Lubricants

because NON-FLUID OIL

yields positive lubrication
lasts 6 to 8 weeks in comb boxes
stays in bearings
lasts longer—less lubricant used—less labor spent in oiling

NON-FLUID OIL is used on their carding machinery by a majority of the largest mills in the country. You, too, will find it improves lubrication and lowers the cost.

Worth looking into—a few grades of NON-FLUID OIL will give you better lubrication at less cost per month throughout your mill. Testing samples and latest Bulletin free. Just fill out coupon and mail.

New York & New Jersey Lubricant Co.

401 Broadway New York

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LEWIS W. THOMASON,
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Ample Stocks at Our Branches
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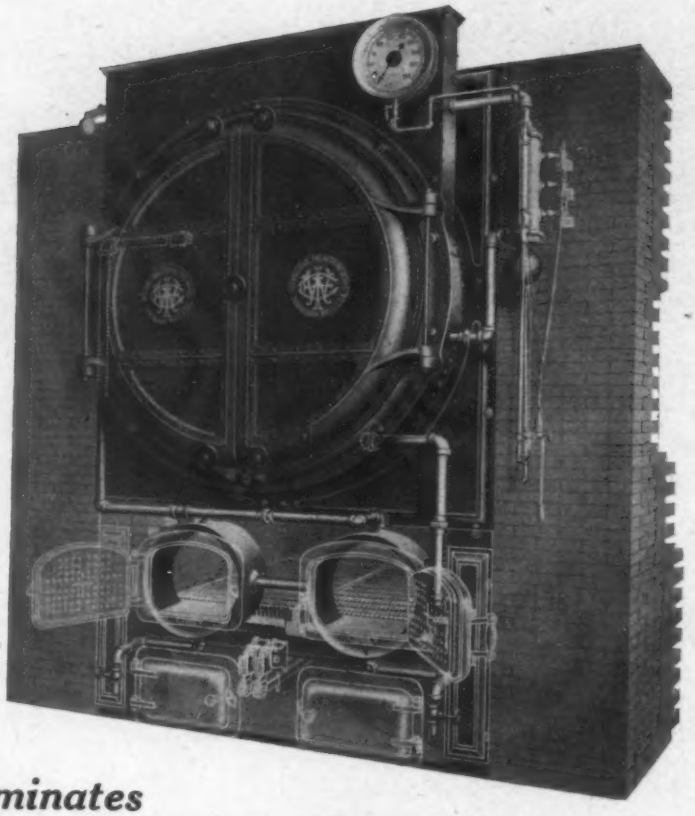
SMITH DOOR PROTECTORS

PATENTED



Eliminates

Repairs on Linings, Arches, Side Walls, Etc.

With the many types and varieties of boilers now in use, the least thought of and yet the largest item of cost is repairs to the front masonry, door linings and boiler fronts. New door linings, arches and side walls have to be put in at least once a year.

The SMITH DOOR PROTECTOR will eliminate these frequent repairs by keeping the fronts and doors cooler than can be done by any other means. In addition the protectors keep the intense heat back so that even with the doors open a fireman can give his fires closer attention which means more careful firing and the resulting saving of coal.

The cost of the installation of SMITH DOOR PROTECTORS amounts to little more than the installation of a new "dead plate" or a single replacement of arches and cheeks. No special work is required with the exception of tapping of two holes in the tube-sheet and the piping to the blow-off to either the ashpit or preferably the blow-off main.

Ask for detailed information about this money and coal saving appliance.

INTERNATIONAL ENGINEERING WORKS, Inc.
FRAMINGHAM, MASS.

Southern Representative: Isaac Hardeman, Charlotte, N. C.

Boston New York Philadelphia San Francisco

"When two or more boilers are connected to a common steam main, two stop valves, with an ample free-blow drain between them, shall be placed in the steam connection between each boiler and the steam main. The discharge of this drain valve must be visible to the operator while manipulating the valve. The Stop Valves shall consist preferably of one automatic non-return valve (set next the boiler) and a second valve of the outside screw and yoke type; or, two valves of the outside screw and yoke type may be used."

(*Extract from A.S.M.E. Boiler code.*)

CRANE STOP CHECK VALVES

Meet the above requirements

They will close automatically; they may be drained when installed in horizontal or vertical positions; the vital parts may be easily examined at any time; made in sizes from 2½ to 10 inches, inclusive.

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BOSTON, SPRINGFIELD, HARTFORD, BRIDGEPORT, ROCHESTER, NEW YORK, HARLEM, BROOKLYN, ALBANY, PHILADELPHIA, READING, ATLANTIC CITY, NEWARK, CAMDEN, BALTIMORE, WASHINGTON, SYRACUSE, BUFFALO, SAVANNAH, ATLANTA, KNOXVILLE, BIRMINGHAM, MOBILE, MEMPHIS, LITTLE ROCK, MUSKOGEE, TULSA, OKLAHOMA CITY, WICHITA, ST. LOUIS, KANSAS CITY, TERRE HAUTE, CINCINNATI, INDIANAPOLIS, DETROIT, CHICAGO, ROCKFORD, OSHKOSH, GRAND RAPIDS, DAVENPORT, DES MOINES, OMAHA, SIOUX CITY, ST. PAUL, MINNEAPOLIS, WINONA, DULUTH, FARGO, WATERTOWN, ABERDEEN, GREAT FALLS, BILLINGS, SPOKANE, SEATTLE, TACOMA, PORTLAND, POCATELLO, SALT LAKE CITY, OGDEN, SACRAMENTO, OAKLAND, SAN FRANCISCO, LOS ANGELES

FOUNDED BY R. T. CRANE, 1855

CRANE CO.

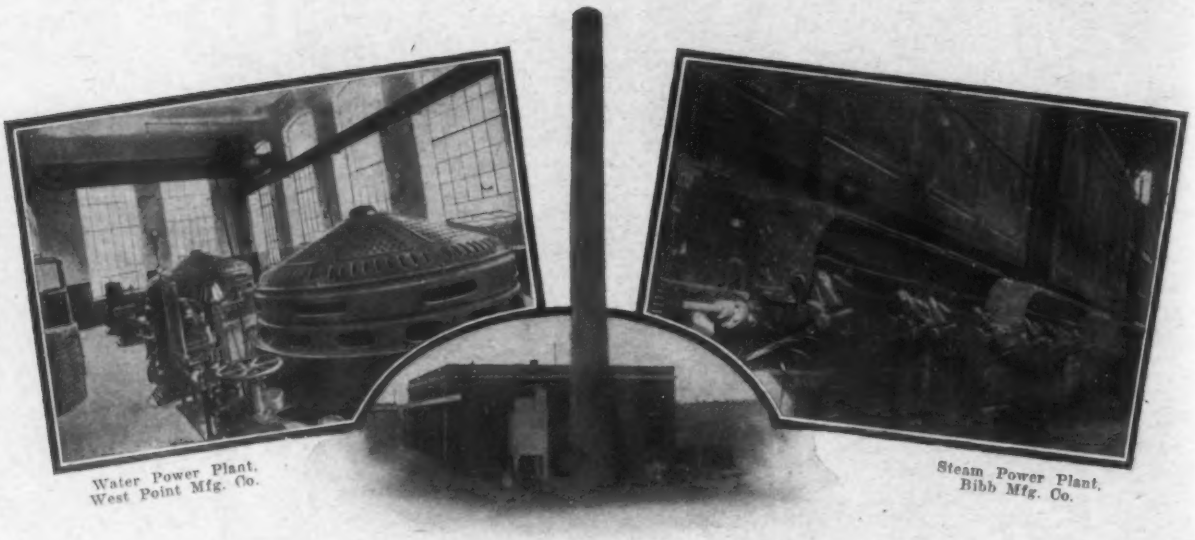
836 S. MICHIGAN AVE.

CHICAGO

WORKS: CHICAGO AND BRIDGEPORT

CRANE LIMITED — MONTREAL, TORONTO, VANCOUVER, WINNIPEG, LONDON, ENG., SYDNEY, N. S. W., QUEBEC, HALIFAX, OTTAWA, REGINA, CALGARY.

We are manufacturers of about 20,000 articles, including valves, pipe fittings and steam specialties, made of brass, iron, ferrosteel cast steel and forged steel, in all sizes, for all pressures and all purposes, and are distributors of pipe, heating and plumbing materials



Water Power Plant.
West Point Mfg. Co.

Steam Power Plant.
Bibb Mfg. Co.

POWER

In order to insure the most economical source of power supply experienced engineers should be selected to design and supervise the installation of your plant whether steam or hydraulic.

This concern has only its services to sell. These services have saved money for our clients in the construction of many types of power development. We would like to study your problems with you.

Our other departments are prepared to serve you in architecture, industrial building or textile machinery arrangements.

ROBERT & COMPANY

Architects and Engineers
ATLANTA, GA.

Says an eminent engineer:

"Three points determine the plane of a builder:

"I. The systematic use of experience."
[*ABERTHAW's calculations are based on tabulated records*]

"II. Economic control of effort."
[*Every step in ABERTHAW construction is planned in advance.*]

"III. Promotion of personal effectiveness."
[*ABERTHAW maintains a department devoted to this one end.*]

In Short: Back of the quality of ABERTHAW accomplishment lies the quality of ABERTHAW organization.

ABERTHAW
CONSTRUCTION COMPANY

BOSTON ATLANTA PHILADELPHIA BUFFALO

TUPELO

("THE HARD-WEAR") LUMBER

Tramp! Tramp!! Tramp!!!

go the feet on a TUPELO FLOOR, and that floor seems to—and actually does—grow smoother, because of Tupelo's "involved" or closely "knitted" grain which prevents slivering or splintering and *reduces the wearing.*

Roll! Roll!! Roll!!!

go the truck wheels over the TUPELO FLOOR in a Textile Mill, a Warehouse or on a Platform where the wear from truck wheels is constant and severe. These are the uses where

Tupelo Stands the Gaff

and refuses to wear down—or out.

Tupelo is *Made* for Hard Wear

If you're going to lay a floor, or have one laid, you want the whole "TUPELO tale." We know it "by heart" and will be glad to tell it.

Will you kindly write and ask for the particulars? Address,

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

805 Perdido Building, New Orleans, La. or 805 Heard Building, Jacksonville, Florida

(Please address office nearest you)

Steel Sash Is Cheaper But—

The big reason for using Steel Sash is not its cheapness, though it is often cheaper than wood.

A better reason is its durability. Wood sash deteriorates much faster than a brick or concrete building, and in time must be replaced. Steel Sash, kept properly painted, lasts indefinitely and is always operable.

But the real reason—the **big** reason—for using Steel Sash is that it PERMITS OF MAKING MORE EFFICIENT BUILDINGS.

Steel Sash can be made in bigger units than wood, because its wind resistance is greater. You can fill a continuous opening 12 feet high and 1000 feet long with Lupton Pivoted Factory Sash. Ninety per cent of that entire area will be glass; over half of it may be opened for ventilation. And by using imposts much higher openings may be used.

Wider buildings, more economical to build and to operate, yet far better lighted and ventilated, are possible when Lupton Steel Sash Products are used. Such buildings will be an asset on your books when old-style buildings have been written off and junked.

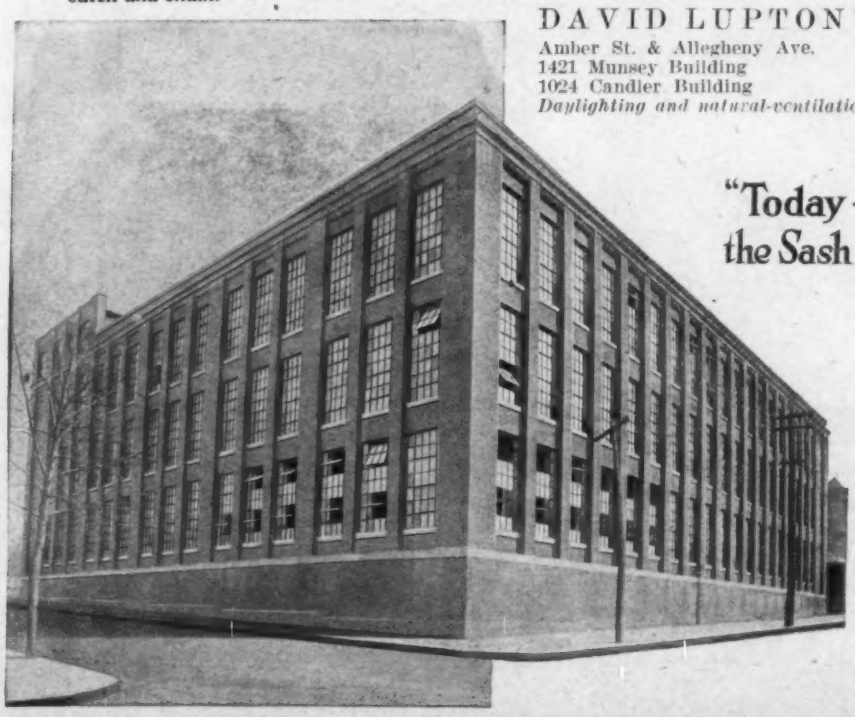
We make several types of Steel Sash for industrial buildings and offices. Our branch offices in Baltimore and Atlanta, and our agents in Jacksonville, New Orleans, Memphis, Greenville and Birmingham will be glad to advise you regarding the most effective application for your contemplated building.

DAVID LUPTON'S SONS COMPANY

Amber St. & Allegheny Ave. Philadelphia
1421 Munsey Building Baltimore
1024 Candler Building Atlanta

Daylighting and natural-ventilation-equipment for maximum production

Reading Cotton Mills, Joseph Bancroft & Sons Co., Reading, Penna.—Lupton pivoted factory sash in side walls. Ventilators individually controlled by spring catch and chain.



"Today —— the Sash makes the Factory"

Lupton
INVESTMENT VALUE
STEEL SASH PRODUCTS

Lupton Pivoted Factory Sash—*Cat. 10-LSS*
Lupton Counterbalanced Sash—*Cat. 10-LCB*
Lupton Steel Partitions and Doors—*Cat.-LSP*
Lupton Rolled Steel Skylight—*Cat. 10--Misc.*
Pond Continuous Sash for Pond Truss roofs, monitors, sawtooths and side walls—*Cat. 10-PCS*
Pond Operating Device for Long lines of sash—*Cat. 10-PCS*

THE FUNCTIONS OF THE ENGINEER

Careful Industrial Surveys Help Fulfill This Year's and Future Accounting Requirements

The safest valuations or revaluations are those based on careful and accurate surveys and appraisals.

From such industrial surveys it is also possible to solve the accounting problems of invested capital. But more important still, is that feature of the report of the Engineer, which outlines suggested changes for bettering production and lowering cost of manufacture.

Still another benefit of the Engineer's survey of an industrial establishment is that the owner can bring up-to-date his plant account and safeguard the present and future from the errors of approximation.

A quarter of a century of experience accumulated in solving the problems of many industrial establishments and textile mills operating under widely different conditions, enables us to deliver a complete valuation report within a minimum of time.

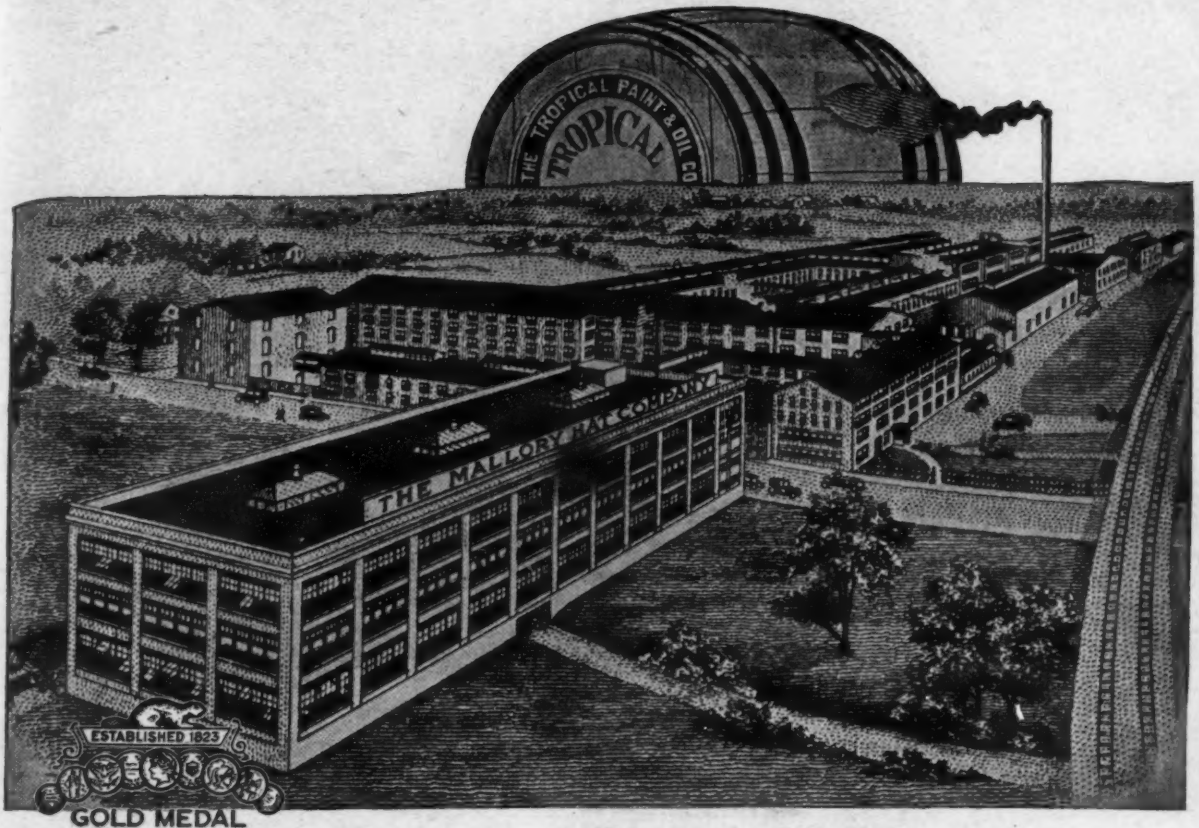
Write for a copy of "Examination and Industrial Surveys" or, if time is a vital factor, wire for a representative.

J. E. SIRRINE & COMPANY

ENGINEERS

GREENVILLE, SOUTH CAROLINA. FARM BUREAU BLDG., DALLAS, TEXAS, 331 MADISON AVE., NEW YORK

SERVICE



GOLD MEDAL
PANAMA PACIFIC EXPOSITION

Mallory

NEW YORK

Since 1914
The Mallory Hat Co. has been using "Tropical" Paints

IT was nearly seven years ago that the Mallory Hat Co. placed its first order for Tropical Paint & Oil Co. products.

Each year since then this nationally known manufacturer of good hats has re-ordered "Tropical."

Tropical Elastikote protects the exterior of many of the Mallory buildings and saves the expensive waste of costly depreciation.

Toco Mill White brightens up the interior. It reflects the stimulating sunlight and helps the Mallory workers to maintain their high standard of workmanship.

There is a special "Tropical" product for every paint problem. And the formula of each has been perfected by years of specialization. You will be under no obligation by asking us to have one of our specialists call. He may be able to offer you some money-saving suggestions.

Protect the Surface with
ELASTIKOTE

Elastikote is a lasting protection for outside wood, metal and brick surfaces. Because of its wonderful elasticity it will not crack. Neither will it peel nor blister. We have prepared a test clearly demonstrating this elasticity which we shall be glad to send upon request.

THE TROPICAL PAINT & OIL CO., Cleveland, Ohio

"The Firm that Serves with what Preserves"

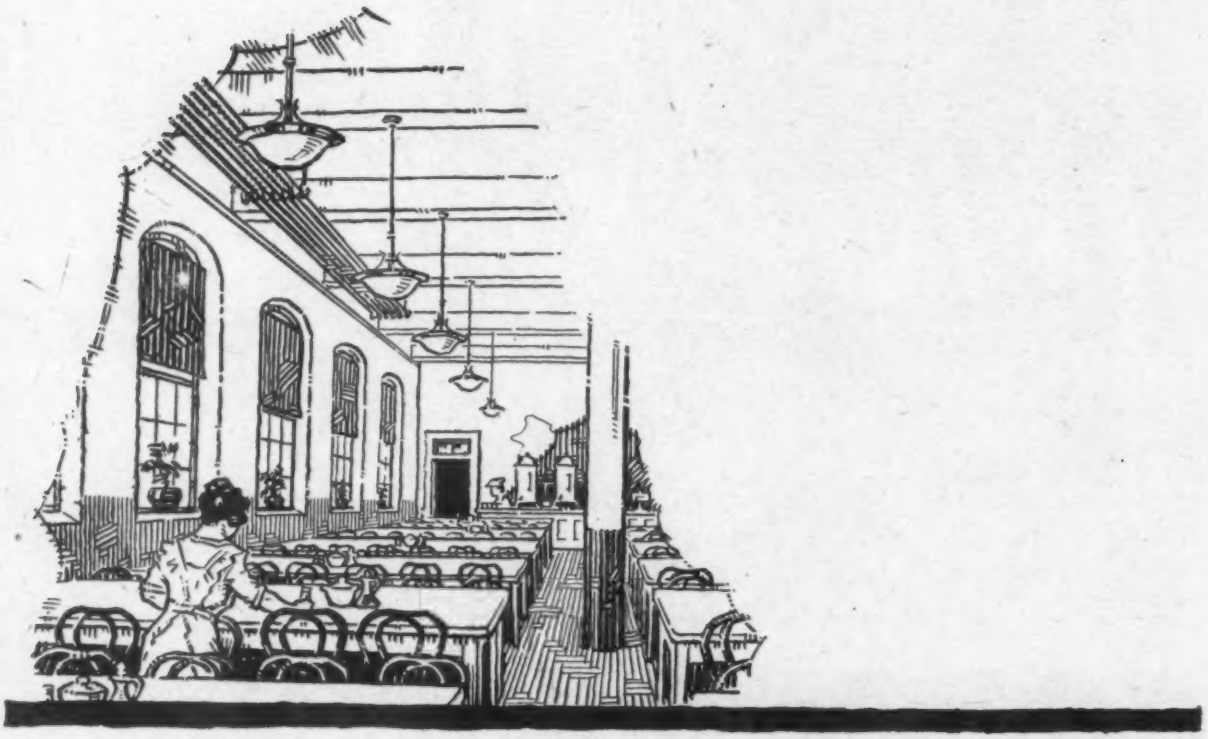
THE TROPICAL PAINT & OIL CO. TROPICAL CLEVELAND, O. U.S.A.

TROPICAL

Paints—Enamels—Roofing Materials

OJACO

MILL·WHITE



BECAUSE men and women can be reached through their stomachs, many manufacturers have found it profitable to install restaurants in their plants, where employees may buy good food at reasonable prices and eat it in surroundings that make the food even more appetizing.

If you have done this—or intend to—go the whole way—and treat the walls and ceilings with OJACO Mill White. Its marvelous faculty of making the sun do double duty is as important here as it is in the departments where your product is made.

It is easy to keep an OJACO Mill whitened restaurant clean and bright. And it's much easier to make food taste good where white walls and ceilings reflect the sunlight in a soft, diffused glow.

It's very economical—low in first cost and long-lived efficiency. Write, wire or 'phone. We'll be glad to give you further information.

OLIVER JOHNSON & CO., Inc.
Paint Makers
Providence, R. I.

DISTRIBUTORS: Cowles & Bleckley, Atlanta, Ga.; Charlotte Supply Co., Charlotte, N. C.; B. A. Cook Co., Fitchburg, Mass.; J. B. Farnum Co., Woonsocket, R. I.; Alexander Grant's Sons Co., Syracuse, N. Y.; Wm. F. Harticon, Fall River, Mass.; Lewis E. Tracy Co., Boston, Mass.; F. P. Van Hosen Co., Rochester, N. Y.; M. F. Bragdon Paint Co., Portland, Me.; Dwelle-Kaiser Co., Buffalo, N. Y.; American Hard Wall Plaster Co., Utica, N. Y.

Von Duprin

Self-Releasing Fire Exit Latches

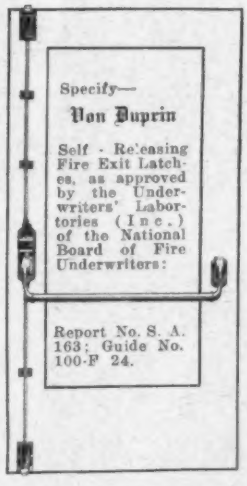
ON GUARD

Year after year, the Von Duprin latches on a building perform the function of the usual door hardware—letting people in and out.

Yet during these years of routine duty they are always ready, day or night, to be of supreme service in time of emergency—to save the lives of perhaps hundreds of panic-stricken people.

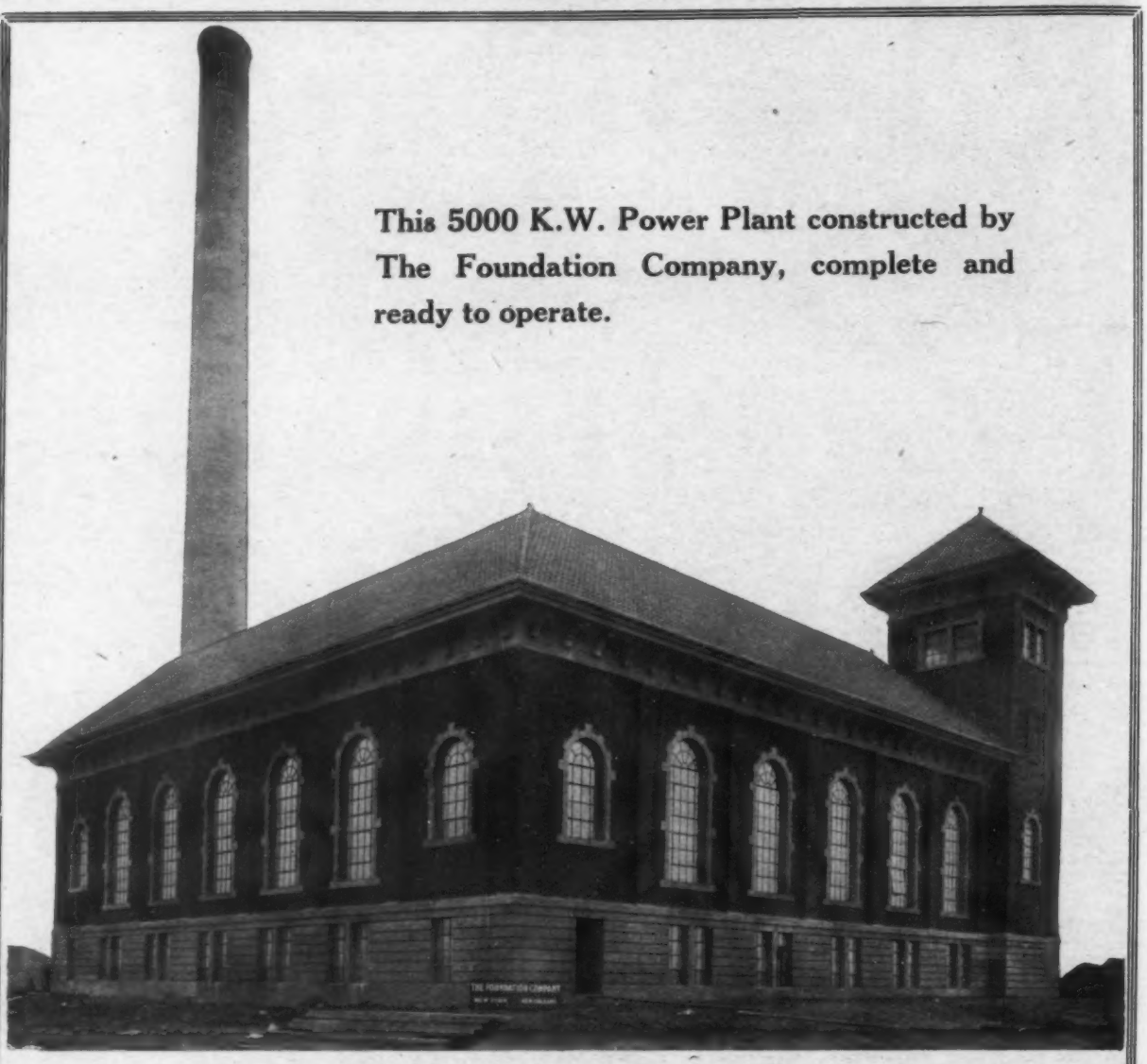
Von Duprin Self-Releasing Fire Exit Latches are, literally, "worth their weight in gold" in times of danger, for a touch of the cross bar immediately opens the way to safety.

Let us send you Catalog 12-T, and the interesting booklet "Saving Lives."


Specify—
Von Duprin
Self - Releasing Fire Exit Latches, as approved by the Underwriters' Laboratories (Inc.) of the National Board of Fire Underwriters:
Report No. S. A. 163; Guide No. 100-F 24.

VONNEGUT HARDWARE CO.
Indianapolis, Ind.

Y. M. C. A., Harrisburg, Pennsylvania. York and Sawyer, New York, Architects



This 5000 K.W. Power Plant constructed by The Foundation Company, complete and ready to operate.

We give the same class of service on the construction of:

Textile Mills	Warehouses	Industrial Plants
Dams	Hydro Electric Developments	Railroads
Bridges	Harbor Works	Mine Shafts

No Contract Too Large or Small for Us to Handle

THE FOUNDATION COMPANY

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ATLANTA
NEW ORLEANS
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SEATTLE
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MONTREAL, CANADA
PARIS, FRANCE
LIMA, PERU
HAVANA, CUBA
TAMPICO, MEXICO

CONDULETS

"Lettering on illustration indicates type of Condulets."

VHA CONDULET
with Holophane Refractor

Attractive Vapor, Gas and Dustproof Condulet

HERE'S an attractive weather proof out of door lighting Condulet.

VHA Condulet is one of the VH Series developed for use with metal or glass reflectors, where vapor or weather conditions might affect the lighting, and especially where there is danger of explosion from gas or dust. With them may be used metal reflectors or glass refractors.

Send today for complete Condulet Catalog, which contains different types of our V and VH Series.

CROUSE-HINDS COMPANY
SYRACUSE, N. Y.
BOSTON NEW YORK CHICAGO

Condulets Panelboards
Knife Switches Floodlights
Guy Anchors
1624

Condulet the Job

CROUSE-HINDS

"NATIONAL DYES ARE NATIONAL ASSETS"

NATIONAL U.S.A. COLORS

"NATIONAL" INDIGO 20% PASTE

SOUTHERN Textile Mills will be interested in the announcement that we are prepared to make immediate deliveries of "National" Indigo 20% Paste from our Charlotte Branch.

¶ Our indigo specialists and modern laboratory facilities enable us to render technical assistance to those who may need such cooperation.

¶ Careful, painstaking effort on the part of trained, technical men, together with large and well equipped manufacturing plants, go far to explain the high standard of "National" Quality.

National Aniline and Chemical Co., Inc.

General Offices

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CONTENTS

EDITORIAL—

Problems for Harding 333

A House Divided 334

GENERAL AND TECHNICAL—

The New Science of Valuation 335

Frequency of Card Stripping 339

The Practical Technic of Mule-Spinning 341

The Effect of High Wages on Efficiency 343

World Cotton Conference 346

Soap 347

Where Does Discipline Begin 353

What the Southern Mills Are Doing 355

Cotton Comment 357

Notes About Men You Know 358

HOW OTHER MEN MANAGE—

A Picker Problem 361

Again Consider the Opener 361

Desires Operation Costs 362

Making 12s and 20s Yarn 365

About the Fine Speeder Twist Problem 365

How the Employment Manager Helps the Overseer..367

Settings for 7s and 8s Yarn 370

The Mill Man's Book of Particulars.....375

Checking the Time of Machine Operation 379

A Self Tightening Pulley Attachment 380

Observations on the Carding Discussion 380

KNITTING SECTION—

Simple Flat Machine Cams 383

The Knit Goods Market 387

The Yarn Market 393

Among the Knitting Mills 395

SANITAS

"Guaranteed Products."

KILLING GERMS IS THE PRIMARY BUSINESS OF DISINFECTANTS

A PLAIN TALK ON DISINFECTANTS

Germs are a menace to health—and therefore to industrial efficiency.

But germs can be killed, the dangers of disease eliminated and efficiency increased. That's the task of Coal Tar Disinfectants.

Therefore, Coal Tar Disinfectants should be judged by their germ-killing powers, for they can be manufactured with a wide range of such powers.

WHAT AN INVESTIGATION REVEALED

We investigated the problems of manufacturing and marketing disinfectants thoroughly before framing the SANITAS policy. We found that in spite of a wide range in the germ-killing power of coal tar disinfectants it was impossible to determine the exact germicidal efficiency by appearance, odor, or even by chemical analysis.

We found, too, that the average disinfectant is not sold on the basis of its true germicidal efficiency. The buyer is given no specific assurance that the product will destroy germ life. His only recourse is an expensive bacteriological test.

We found that there are two methods for testing the germ-killing power—either may be used—but there exists a variation of 10 to 30% in the results obtained by these methods.

And further, we found that the *germicidal test must be made of each batch of disinfectants manufactured* if its exact germ-killing power is to be known.

So we built up the SANITAS Policy.

STEPS IN SELLING DISINFECTANTS OF KNOWN GERM KILLING STRENGTH

1. SANITAS Coal Tar Disinfectants are tested for germicidal efficiency by the more conservative method which shows lower but more uniform results.
2. Each and every batch manufactured is submitted to test in the SANITAS Bacteriological Laboratory to make certain that it meets the specifications before it is approved for shipment.
3. Each container of SANITAS Coal Tar Disinfectants bears a statement of the germicidal efficiency of the product.
4. *Each shipment is accompanied by a written guarantee that the product comes up to the strength specified on the package and invoice.*

AND SANITAS GUARANTEED PRODUCTS ARE NOT EXPENSIVE

SANITAS Coal Tar Disinfectants are priced according to their strength. There is no waste in their purchase. The buyer gets the germ-killing power that he pays for. Users of SANITAS Guaranteed Products have been gratified with the decreased cost of *efficient health protection.*

AN INTERESTING BOOKLET: DISINFECTANT FACTS FOR THE PRACTICAL BUYER.

We have just issued a booklet on disinfectants which gives some interesting facts on the subject, not generally known. We suggest you write in for it on your business letterhead today. We'll gladly send it to you by mail; and your request will place you under no obligation, of course.

THE SANITAS COMPANY, Inc.

33 Keap Street, Brooklyn, N. Y.

With the Publishers—

CHARLES W. MCKAY.

Plant Appraisal and the Income Tax

During the past year a most important use of engineering appraisement has been evolved—the re-instatement of invested capital. Many industrial companies are paying excessive Federal taxes due to the fact that their invested capital has been excessively depleted through the use of a policy that was formerly considered good accounting practice. This consisted of charging to expense accounts during profitable years the cost of items which rightfully should have been charged to the capital accounts. The net result of this practice has been to deplete the book value of the property to a point where it no longer represents the present true worth of the fixed assets.

Beginning in this number of COTTON is a series of articles on engineering appraisement which will take up in more or less detail the points of especial interest to the industrial plant manager. In securing the author of "The New Science of Valuation," which is the title of the first article of the series, to prepare this series for COTTON the Editorial Department have been particularly fortunate.

Charles W. McKay, the author in question, is a graduate of Sibley College of Mechanical Engineering, Cornell University, class of 1906. In July, after his graduation, he entered the employ of the New York and New Jersey Telephone Company (now the New York Telephone Company), and after serving a brief apprenticeship in the maintenance department was assigned to the plant engineering department. In 1909 he was appointed engineer for the North Brooklyn district, having charge of the preparation of plans and estimates for all outside construction work within that district. In 1910, at the time the New York Telephone Company absorbed all of the upstate Bell companies, Mr. McKay was assigned to this special work and spent the greater part of the following year inspecting a number of the larger of the company's newly acquired properties and in 1911 he was appointed engineer for the Borough of Queens.

During the year 1912-13, Mr. McKay was associated with Henry Floy in the capacity of assistant engineer, and while holding this position he was identified with several important appraisal cases. In the summer of 1913 he became engineer to the McCall & Clark Company, efficiency engineers of New York, and in October, 1913, became affiliated with McMeen & Miller, of Chicago. While with this well known engineering firm Mr. McKay spent the major portion of his time on problems involving the appraisement of public utility and industrial properties. He later engaged in valuation work for the Central Telephone Company and continued in this capacity until his appointment in 1918 with the Cooley & Marvin Company, of Boston, engineers and accountants, where he became chief appraisal engineer.

In 1919 he resigned this position to take charge of the appraisal division of L. V. Estes, Incorporated, of Chicago, where he specialized in problems involving the appraisement of electrical utilities and industrial properties.

Beginning with the present year, he separated from the Estes organization and formed a partnership with P. C. Sherman—president of Sherman and Associates, Inc., industrial engineers of New York—under the firm name of McKay and Sherman, with headquarters in Chicago, having been made president of the new company.

Mr. McKay is a member of the advisory council of the Industrial Extension Institute of New York and is the author of their book "Valuing Industrial Properties." He is a prolific writer on appraisal subjects and has contributed extensively to the technical press.

Since the formation of the new firm of McKay and Sherman, the valuation department formerly operated by Sherman and Associates has been absorbed by the new firm which, besides its main office in Chicago, has also established branch offices in New York, Indianapolis, Philadelphia and Washington. His many years of close association with appraisal work in the industrial field has given Mr. McKay a most thorough and exhaustive experience upon which he has drawn in the preparation of his present series of articles.

Card Sliver and the Stripping Schedule

Even numbers and a constant breaking strength are much to be desired factors in yarn manufacture. The ability to produce the first undoubtedly aids in securing the second. For this reason the results of the tests described by James Robertson in his article "Frequency of Card Stripping" which appears upon another page, will be welcomed by the practical reader and mill manager.

His suggestion that superintendents arrange to carry out some such system of tests, similar to those outlined in the article, opens up a field for investigation and discussion well worthy of consideration. Are the cards in your mill being stripped often enough to secure the best results on the product produced, not only so far as appearances go, but also in uniformity of sliver and in the final yarn numbers?

The Editors of COTTON will gladly devote space to the results of such tests in the department entitled "How Other Men Manage," and will welcome discussion on this and other kindred subjects. Such tests and discussions are an invaluable aid in pointing the way toward better practice and more satisfactory results. Furthermore, COTTON pays for all such letters accepted and printed, thereby furnishing a double incentive to every man who will honestly try to investigate and improve manufacturing processes.

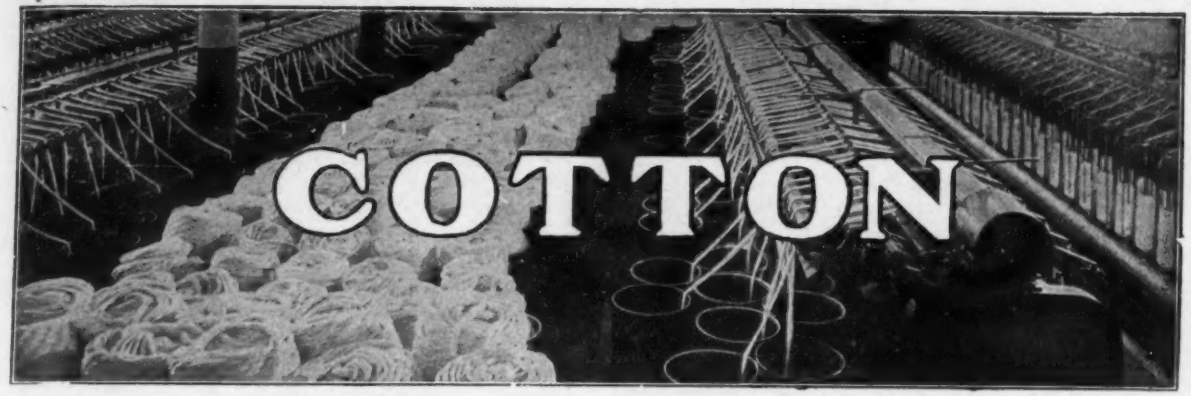
AMONG COTTON'S READERS

W. M. Sherard

Vice-President and General Manager Glenn-Lowry Manufacturing Company, Whitmire S. C.

"COTTON is a very interesting journal. It covers different subjects in which manufacturers are so deeply interested that no one can even glance through its pages without being materially benefited."

W. M. Sherard



March, Nineteen-Twenty-One

Problems for Harding.

The nation faces momentous issues on the eve of Inauguration Day. Europe is aflame with bitterness and hate, which may yet plunge that continent anew into war. At home we have a still growing peril of unemployment, with unsolved problems of taxation, tariff and immigration —problems in themselves unsolvable while Europe remains in chaos.

Is it any wonder that the Republican leaders at Washington reveal little eagerness to proclaim solutions for the problems they must face? Inauguration day will bring new men, new issues, new policies and new principles, and the new administration will find its accumulation of troubles made none the less important by the fact that for more than a year President Wilson has been ill and his administration has had to lay aside for future solution many of the vital problems that called for immediate action. For the last four months, of course, the present administration has not been in a position to undertake new enterprises, and has been forced by the results of the November election to bequeath these trials to the new regime.

This has been true, particularly because the two houses of the Congress have been in Republican hands. But the leadership in each house has shown a desire to leave most of the difficulties to President Harding. He has not been inclined to interfere, except for an urgent message that the necessary appropriation bills be passed and the nation will not know until it hears his inaugural address, the solutions President Harding has in mind, or the policies he will follow, in meeting the issues of the hour.

Even the announcement of the makeup of his cabinet has been delayed so long that it is impossible to forecast what line he expects to follow. For the cabinet in the new administration will be far more important than in that of President Wilson. President Harding has the reputation of seeking advice and following it. President Wilson did little of either. Ordinarily, the leaders in the two houses might have been looked to to furnish much of this advice and to do much toward carrying it out. The experiences of the winter session of the present Congress revealed little in the way of aggressive leadership in either house. As the leaders of the expiring Congress will remain as the leaders of the new, it is not difficult to prophesy that there will be little likelihood of any Congressional leadership that will attempt to run counter to the White House views. President-elect Harding, while still the Senator from Ohio, promised to keep definitely in mind the line which the Constitution has drawn between the executive and judicial functions and to respect the powers and the duties of the Congress. But it begins to look as though Congress will look to him for far more leadership than he is willing to undertake. There were times during the winter session when the Republican leaders of both the House and the Senate sought his views in an effort to make their policies align with his plans. This solicitation, however, did not always result in definite replies, and that uncertainty contributed much to the fact that Congress left important work undone, which must now be undertaken by the Sixty-seventh Congress, either in the special session or in next winter's work.

There is every evidence that the work of the new session will be complicated by the temptation of the incoming Republican powers to force an accounting of the stewardship of their Democratic predecessors. They tried to do much of this during the last two years, while they had control of the two houses of Congress, but the temptation will be far greater now when they have the whole machinery of the government in their hands and have full access to the confidential files and records of each department.

It will take considerable time before the Harding administration may be said to be in full blast. Although the new cabinet will be confirmed by the Senate, in special session, immediately upon the completion of President Harding's inaugural address, these ten men are only the heads of the ten executive departments. All their assistants—and even more important, all their bureau chiefs—will not take office until later. It probably will take weeks before a real reorganization of the government can be said to have been completed. In the meantime, it will not be impossible that factional political troubles will enliven the selection of these various minor officials, and here again there will be opportunities for delaying the actual inauguration of the Harding policies.

Even more difficult will be the selection of ambassadors and ministers and the general reorganization of the State department and its representatives abroad. Our domestic industrial and commercial situation is so closely bound up with the reorganization of our foreign relations, that this task will be watched with double interest. It carries with it, too, the great problem of our relations with Germany.

We are still at war with that power, and the resumption of peaceful relations, with the question of a treaty of peace, is one of the greatest problems which President Harding will have to handle speedily. In it is also involved the whole problem of our relations with the Entente powers and he probably will have to do—what the Wilson administration succeeded in avoiding—make public announcement of our government's views concerning the amount and the extent of the indemnities to be paid by Germany under the Treaty of Versailles.

No matter how we succeed in establishing peaceful relations with Germany, whether by special treaty or by modifications of the treaty of Versailles, there will be no way in which we can avoid a direct answer to the questions of our acceptance or rejection of the proposals of the entente ministers concerning the enforcement of the reparation clauses of the document that was signed at Versailles more than a year ago.

In this also is involved the question of our attitude toward the general problems of European reconstruction. There were many indications during the last few months that even the Wilson administration did not agree on many points with the attitude of London, Paris and Rome towards the remnants of the Central Powers. But the Wilson administration found it necessary to make public these differences only in connection with the various phases of the Russian question. President Harding's administration will have to take a definite stand on the whole question of European relations, not only with Germany and Russia, but with the new countries carved out of the Austro-Hungarian empire as well as with the Balkan nations and Turkey.

And on these solutions depends an evergrowing portion of the solution of our domestic problems. For there is no question that the chaos in Europe has been chiefly responsible for the difficulty of readjusting our industrial, commercial and financial operations here at home. No one knows today what Europe can buy or pay for or produce. And until we know that, we cannot answer the questions upon which hang the vital problems of prosperity at home and peace abroad.

A House Divided.

The reduction of cotton acreage during the present cotton year has been conceded by many to be the one thing necessary to place the price of the staple on a plane more equitable to its production cost. There has been much agitation of the question and a lot of propaganda work on the part of individuals. Notwithstanding all this activity, the estimate of a 20 per cent reduction as made by Theodore Price is probably very liberal.

The difficulty has always been that in the great body of planters there are many opinions and many local leaders and these are often at variance with the main thought which some of the self-constituted leaders have advanced. It was because of a very thorough knowledge of these difficulties that the Memphis conference adopted a plan that attempts to coerce the recalcitrant planter, by denying him the credit to which he is entitled as an honest citizen, unless he agrees to train his mind to think as they think.

These self-appointed leaders are trying to make names for themselves in history, similar to their prototype, Moses, by leading the poor farmer to prosperity—and it is a noticeable fact that many of them are cotton brokers, merchants and bankers. Another noticeable feature is that almost no effort is being made to increase the quality of the staple, despite the fact that the present large proportion of almost unmerchantable low grades aids in keeping down the sagging market by increasing the statistical figures of cotton on hand.

But west of the Mississippi another Moses has arisen. An editor this time. Among his December editorials he prints what he calls "some amazing figures." We concede they are. Of course he lays the planters troubles on the "spinners." One of the examples he cites is the experience of a man at Salado, Texas, who sold a bale of cotton ou November 19th for 6½ cents a pound. This man then went across the street and purchased a suit of overalls for $4.00. As this suit weighed 2½ pounds, the conclusion the editor draws is that 200 suits of overalls could be made from the bale of cotton (for which the man says he received $32.50) and sold for $4.00 a suit, producing a gross sum of $800. From this he generously deducts $135 as the merchant's profit and the $32.50 for the raw cotton leaving a profit to the manufacturer of $632.50.

The editorial continues, "Of course, this $632.50 doesn't represent profits altogether, for the items of freight, cost of manufacture of the cloth and of the suit, and one or two other small items must be taken into consideration." He fails, however, to indicate what becomes of the necessary waste extracted from the cotton in the course of spinning, weaving and cutting up. Surely wastes cannot be made into overalls. And this brings us to the crux of the plans of this new Moses.

Six unnamed "big cotton merchants at New Orleans" are given as the authority that "the spinner can pay 65 cents for cotton and then make 18 cents per pound profit, and on some grades 30 cents." Fine! Therefore he proposes that each of the 4,500 farmers in Bell county agree to add a certain number of acres to the cotton land which he had intended to plant for the coming crop, say two, four, six or ten, and call this extra acreage his "cotton mill patch," the production from which he agrees to trade into a local cooperative organization to build a cotton mill, accepting in return whatever number of shares of stock at par this cotton will purchase at the then market price.

After this mill is built and equipped we presume it is intended for it to purchase locally grown cotton at 65 cents a pound, although on this feature the oracle is silent. Neither is anything said about who will operate the machinery in this completed mill. Presumably the farmers will have little time to devote thereto as they will be busy growing 65 cent cotton to keep it in operation. They will also need one of these present omniscient "spinners" as a manager for the mill as it takes a mighty smart man to clear 18 to 30 cents a pound on his product these days, especially if his raw cotton sets him back 65 cents a pound.

We'll say it does!

Seriously, the principal feature of interest about this Texas scheme is that it shows the division of opinion among the cotton growing interests. Some want to curtail acreage. Some want to expand acreage. And when the differences are settled, it is probable the acreage will be only slightly sub-normal.

The New Science of Valuation

BY CHARLES W. McKAY.

At first thought, it may seem strange that a subject of so real importance to the industrial executive as that of industrial valuation, has received so little serious consideration, until within the past few years, from the industrial executives themselves. However, a little thought and retrospection will clearly disclose the reason. It is only within the past few years that industrial valuation work has been placed upon such a plane as to warrant its serious consideration—for purposes other than fire insurance.

It is of paramount importance that the industrial appraisement, to be of real use to the operating executive, should be so designed and so executed as to anticipate the requirements of both cost accountants and auditors. There should be a clear understanding between the members of the engineering and accounting professions, especially with respect to the subject of depreciation and the relation of this subject to industrial valuation work. Until a comparatively few years ago accountants have been prone to criticise, and indeed they have had every reason to criticise, industrial appraisement methods.

The industrial appraiser, of the old school, had absolutely no conception of the relation between appraisement and cost accounting. The word "appraisement" often signified little more than the mere listing of component items of machinery, equipment and buildings and the pricing out of the resultant inventory in a form suitable for insurance purposes—with utter disregard for the requirements of the cost accountant and of the auditor. In fact many accountants—unless they are familiar with the more modern appraisement methods—are quite frank in stating that it is well nigh impossible to utilize the average appraisement for purposes of cost accounting, or even of general bookkeeping. This regrettable fact has been one of several factors which have led to the evolution of the modern engineering appraisement.

The Development of Appraisal Work.

The purpose of this series of articles is to explain the function of the engineering appraisement as an adjunct to modern industrial management and to show that it is perfectly possible to evolve one form of appraisement which will serve equally well for all valuation purposes. As a preface to the present discussion it may not be amiss to pause for a moment and trace the evolution of modern industrial valuation. Many people are under the impression that the engineering appraisement is the direct outcome —or rather a perfection of—the old form of insurance valuation. This is not the case.

The industrial engineering valuation really owes its inception to the precedent established in the field of public utility appraisement. For over fifteen years it has been customary to evaluate public utility properties and work in this field has, of a necessity, become highly specialized. Furthermore it has attracted some of the best engineering talent in the country. This fact may be attributed largely to the use to which public utility valuations are put. Most utility appraisements are prepared for submission as evidence before courts, or public service commissions. Naturally data of this nature must be prepared with most careful attention to the basic underlying principles and with equally careful attention to all of the details involved.

It is a fact of history that public utility appraisement, as such, had its inception in the fifteenth century. During the fifteenth century the Mayor of London appointed a committee to establish uniform rates for boat hire on the river Thames. In connection with the rate investigation a valuation was made of the property of all of the individuals, or companies, owning passenger transportation facilities on the Thames.

Subsequent to this early effort at valuation work, there are records of many attempts at evaluation of—what would now be classified as—public utility enterprises and, in some cases, of other business properties. In many of these cases the evaluators attempted to determine values through a direct reference to the company's books and records of original purchase. It nearly always developed, however, that then, as now, such records of original cost proved inconclusive and it was found necessary to abandon the research method in favor of a more strictly appraisement method of determining values. Especially was this true in the case of old companies where records of old transactions necessarily proved to be inconclusive.

During the latter part of the 19th century a real impetus was given to valuation work, as we now understand the term, by the various State legislatures through their enactment of the present public utility laws. At about this time public service commissions were formed in almost every state in the Union for the purpose of investigating the then existing rates charged by the public utility companies and if these rates proved exorbitant, or inadequate, it was the duty of the commission to establish new rates which were deemed equitable both to the companies and to the public. One of the most important factors to be considered in the establishment of public utility rates is the fair value of the property, or properties, under consideration.

As previously suggested, public utility valuation has attracted some of the ablest engineering and accounting talent in the country and much valuable precedent—both as to theory and as to practice—has been established which has been given most careful consideration in the evolution of the present form of industrial engineering appraisement. Especially is this true in the case of the relation of the industrial appraisement to accounting and auditing problems. All public utility valuation—at least if it be prepared for submission to public service commissions—must necessarily be prepared with the strictest attention to the uniform systems of accounts as prescribed for public utility companies.

Engineering Appraisement and the Banker.

There are other, and perhaps equally important, reasons why the industrial engineering appraisement has reached its present high state of perfection. Bankers in considering prospective loan risks, have frequent occasion to refer to properly constituted industrial valuations. The industrial appraiser of the old school made many valuations for financial purposes. His usual method of procedure, however, was to make a modified form of re-

production cost insurance valuation and to deplete the values thus obtained to reflect the present depreciated condition of the property. In many cases he was entirely unqualified to attack this phase of the problem. Many factors enter into the present worth of a property—from the standpoint of the banker—aside from the actual observed physical depreciation. Functional depreciation—inadequacy and obsolescence—is quite, and perhaps even more, important than physical depreciation. A machine costing $1000 may be in 90 per cent condition in so far as actual observed physical depreciation is concerned. In other words from the standpoint of physical depreciation it will have a present worth of $900. However, it is quite possible that this same machine may be inadequate for the purpose for which it was installed, or, it may have become obsolete. In either, or both, of these cases the present net worth as presented to the banker should reflect both inadequacy and obsolescence. If the machine is obsolete, or obsolescent, and will have to be replaced at an early date the present net worth is bound to be far less than 90 per cent despite the fact that the actual observed physical depreciation is only ten per cent.

All of these factors must be given the most careful consideration in preparing an appraisement for financial purposes. The problems involved are engineering problems and may be solved properly only by the trained appraisal *engineer*. Again, the financial report resultant from an appraisement for financial purposes should, to be of real value to the industrial banker, incorporate many features aside from those pertaining strictly to matters of valuation. Among other things such a report should present a concise survey of operating conditions; present and probable future material and labor conditions; pertinent comments as to the personnel of the operating and executive organizations; terse, well thought out, comments as to the past, present and probable future capacity of the company for expansion; in some cases, an audit and pertinent comments as to the results disclosed by the audit; a review of the company's cost accounting practices and, finally, a terse resume, and recapitulation, of the entire situation presenting in readily assimulated form the facts of vital interest to the banker.

Obviously, all of these additional factors are strictly of an engineering and accounting nature and may be properly assembled and commented upon by trained engineers.

Depreciation—Its Relation to Valuation.

Another factor that has been, in no small degree, responsible for the evolution of the modern engineering appraisement is the Federal income tax with its attendant problems of determining proper allowances for physical depreciation, depreciation due to obsolescence and depreciation due to inadequacy.

Before considering the application of depreciation to the Federal income tax problem it may be well to review briefly the underlying theory.

There are four prime causes to which may be attributed the shortening of life of the component elements of an industrial property. These causes are:

1. Depreciation resultant from physical causes, such as wear, tear and use.

2. Depreciation resultant from physical causes (but not due to use)—depreciation resulting from age and physical decay.

3. Depreciation not resultant from physical causes. Such depreciation may be due to "inadequacy" or it may be due to—

4. Obsolescence.

The depreciation falling under the first classification is, as its definition suggests, that depreciation which naturally results from the operation of the plant. Machinery, for instance, will gradually deteriorate through long use despite the most careful maintenance and the frequent replacement of minor short lived parts. There will come a time when it is more economical—and far better operating practice—to dispose of a machine than to try to prolong its useful life.

To illustrate the class of depreciation outlined in the second numbered paragraph—that due to age and physical decay—we may assume that a certain machine is installed in plant ready for use, but for some reason it has never actually been used. In time, it will deteriorate from age alone, especially if it be composed of materials subject to more or less rapid deterioration. Under this latter classification will fall certain types of electrical machinery where a large amount of insulated wiring is used. It is a known fact that electrical insulation has a certain definite life regardless of whether or not it is in use. Another illustration may be found in the case of machinery composed of wooden parts, or of metal parts that are especially susceptible to corrosion.

Most operating machinery is susceptible to depreciation from both of the foregoing causes. Wear and tear (or use) and age. In fact these two classifications of depreciation are frequently referred to collectively as "physical depreciation."

Depreciation falling under the third classification—inadequacy—may be defined as that depreciation (or shortening in life) which may be attributed to the fact that a given machine is no longer adequate to perform the function for which it was originally installed. It may be that a larger machine is required.

The fourth class of depreciation——that resultant from obsolescence—is quite similar to inadequacy in that it may be segregated entirely from physical depreciation. In this case, however, the item of plant under consideration may have to be retired from service before the end of its useful life, not from physical causes but due to the fact that it becomes "obsolete." Something newer, or better, is brought on the market and it is deemed advisable to retire the item in question in favor of a machine of newer design. A good illustration of depreciation from obsolescence may be had in the automobile field. It is a known fact that many cars, a year or more old, are in excellent physical condition and yet they have become obsolete and their market value drops accordingly.

The two last named causes of depreciation—inadequacy and obsolescence—are frequently referred to collectively as "functional depreciation," in contra-distinction to "physical depreciation."

In the ordinary industrial plant all four causes of depreciation are to be reckoned with and have a very real bearing upon the shortening of life of industrial equipment.

Depreciation and the Federal Tax.

Now as to the relation of depreciation to Federal income tax problems. It is a known fact that depreciation

is an allowable deduction from gross revenue in determining taxable income. Obviously, the higher the depreciation allowance authorized by the Government, the lower the Federal tax. The Federal Government, however, does not prescribe rates of depreciation which shall be used in solving the depreciation phase of the tax problem. In fact the rulings of the Treasury Department state quite definitely that depreciation shall be based upon average lives and furthermore that average lives shall be determined entirely by the taxee or his engineering and accounting advisors. In other words, this whole question of determination, and substantiation, of depreciation allowances is one that must be solved by the taxee. If the solution is faulty, he, the taxee, usually suffers accordingly. The Federal authorities have neither the time, nor the disposition, to show each individual tax payer how he may compute annual depreciation (in strict accordance with Treasury Department dictates) to obtain a higher depreciation allowance than would be the case if depreciation were computed by older and more obsolete methods.

I quote herewith from a recent communication from the Treasury Department.

> "Replying to your inquiry as to the proper rates to be used in computing depreciation on various classes of machinery, you are informed that *no rates* are *prescribed by this office.* The rates must be determined by the estimated number of years constituting the probable life of property with respect to which depreciation is claimed."

The foregoing quotation is certainly clear, to the point and leaves no chance for doubt in the mind of the tax payer. Expressed in another way, it means that the entire plant and equipment—including buildings, machinery, miscellaneous equipment, etc.,—shall be subdivided into homogenous classifications (classifications having the same, or nearly the same, average lives) and that average lives, and therefore depreciation rates, shall be determined for each of the classifications. The determination of such average lives may be based entirely upon the peculiar conditions existent in the plant under consideration. A water tube boiler, for instance, may in a given plant have an average life of twenty years. In a second plant—possibly only a few miles away from the first plant—it may be found that a reasonable average life will be fifteen years. In both cases the assumptions may be justifiable and may be accepted by the Federal authorities. The five year difference in life may be attributed to individual peculiarities existent in the two cases under consideration. The nature of the feed water used in one case may tend to appreciably shorten the life of the boiler, or it may be that operating conditions are unusually strenuous in the case of the shorter lived boiler. In other words, each case must be analyzed according to its individual peculiarities.

As previously stated, the Federal authorities do not prescribe depreciation rates. They *do* specify, however, a method for determining the basic figures to which these rates shall be applied. I quote herewith an excerpt from a recent letter from the Treasury Department:

> "A reasonable allowance for the wear and tear of property arising out of its use or employment in the business or trade is based on the cost of such property, or on its fair market price or value as of March 1st, 1913, if acquired prior thereto. In the absence of proof to the contrary it will be assumed that such value as of March 1st, 1913, is the cost of the property."

The rulings of the Treasury Department with respect to the annual depreciation phase of the tax problem may be summarized briefly as follows:

1. The actual original costs must be determined for all property acquired subsequent to March 1st, 1913,—such costs to be obtained from the books and records of the company whose property is under consideration.

2. Where property has been acquired subsequent to March 1st, 1913, and there is no record—as shown by the company's books or invoices—as to original cost, the "fair cash value" as of March 1st, 1913, shall be used.

3. For property acquired prior to March 1st, 1913, the "fair cash value" as of that date shall be used.

4. To the costs, as thus determined (fair cash value as of March 1st, 1913, for property acquired prior to that date and actual original cost of property acquired subsequent to March 1st, 1913) there shall be applied certain depreciation rates—these rates being used for the computation of annual depreciation.

5. The depreciation rates to be used are to be based upon the average useful lives of the various items of plant component to the total of the physical assets.

From the foregoing it will be obvious that a good deal of latitude is allowed the taxee in preparing his depreciation statements. It is impossible to completely describe the detail of the methods involved in a depreciation-base-appraisement in the space alloted to this article. This phase of the subject of engineering appraisement will be made the topic of a subsequent article in the present series. However, to illustrate the benefits which may accrue from a properly prepared appraisement the following illustration is given:

A certain manufacturing company carries its fixed (depreciable) assets at $1,000,000. Of this amount $250,000 represents the book value of the buildings and $750,000 the value of the machinery and incidental equipment. The company in question has always adopted the obsolete policy of depreciating both buildings and machinery by using certain arbitrary percentages—two per cent, in this case, for buildings and five per cent for machinery. Applying this method, the annual depreciation upon the buildings amounts to $5,000 and the depreciation on the machinery amounts to $37,500—a total of $42,500. This latter amount the company has been in the habit of setting aside to cover annual depreciation.

It will be noted, in connection with the foregoing illustration, that no attempt has been made to segregate the various component elements of the building and machinery accounts.

Now let us assume that a new depreciation schedule has been made based upon an engineering appraisement. First, an inventory is taken and subsequently this inventory is priced out on the basis of "fair market value" as of March 1st, 1913, for property acquired prior to that date and actual original cost for property acquired subsequent thereto. The inventory and appraisement is so divided and so classified as to segregate the various major elements of plant equipment—elements having approximately the same average lives. The results of such an appraisement are shown in the first column of figures in Table 1.

TABLE ONE
COMPUTATION OF DEPRECIATION
(By method of analysis and appraisement of fixed assets.)

	Classification	Original Cost.	Depreciation Rate.	Amount of Depreciation.
1.	Buildings	$ 400,000	2.0	$ 8,000
2.	Building equipment	100,000	4.0	4,000
	Total items 1 and 2	$ 500,000		$12,000
3.	Power equipment—			
	Boiler plant	$ 65,000	5.0	$ 3,250
	Engine plant	95,000	5.0	4,750
4.	Factory equipment—			
	Large machinery	1,055,000	5.0	52,750
	Small machinery	18,000	7.0	1,206
	Electrical equipment	120,000	12.5	15,000
	Tool equipment	1,500	12.5	190
	Machine equipment	33,000	12.5	4,125
	Instruments	3,000	8.0	240
	Pulleys and shafts	51,000	10.0	5,100
	Belting	30,000	25.0	7,500
	Shop fixtures	22,000	10.0	2,200
5	Garage equipment	3,000	12.5	375
6.	Patterns and drawings	1,000	15.0	150
7.	Office furniture and fixtures	2,500	10.0	250
	Total (items 3, 4, 5, 6 and 7)	$1,500,000		$97,140
	Grand Total (items 1 to 7 incl.)	$2,000,000		$109,140

It will be noted that the resultant values are much higher than the old values as shown by the company's books.

In connection with the appraisement it may be further assumed that proper average lives and depreciation rates have been determined as shown in the second column of figures in the table. These rates are applied to the original costs (and costs as of March 1st, 1913) with the results as shown in the third column of figures in Table One. The resultant total annual depreciation is approximately $109,000. This gives an increase of nearly $67,000 over the annual depreciation as computed by the obsolete method as based upon the book figures and arbitrary depreciation rates.

The reasons for this increase are two fold—first proper depreciation rates have been determined, and second these rates have been applied to original costs (and costs as of March 1st, 1913) instead of to depleted book values. The resultant advantages from the standpoint of the tax payer will be obvious.

The Re-Instatement of Invested Capital.

During the past year a most important use of the engineering appraisement has been evolved—the re-instatement of invested capital. Many industrial companies find themselves confronted today with a most perplexing problem through no fault of their own, if we view the policy they have adopted in the light of what was formerly considered good accounting practice. Conservative companies have been in the habit—in bygone days—of taking advantage of profitable years to excessively depreciate their plant accounts and, in some cases, to charge to expense the cost of items which rightfully should have been charged to the capital accounts. Obviously, this policy has resulted in an excessive depletion of invested capital and a correspondingly high tax.

The question naturally arises, "How may this difficulty be remedied, in a manner fair to the Government and fair to the tax payer?" The obvious solution—and it is believed the only one—is through a properly constituted engineering appraisement. Such an appraisement, briefly, should be performed in the following manner:

Take a complete and detailed inventory of all of the property items which properly belong to the fixed capital accounts; price out this inventory on the basis of actual original costs as obtained from the company's books, invoices and records (regardless of whether the costs have been originally charged to the expense or capital accounts); make a careful and detailed inspection of the plant, and its component items of equipment, and determine the actual accrued depreciation; deduct this depreciation from the original costs and, finally, set up the *difference* between the total value, as obtained by the foregoing method, and the old book value as an increment to the capital account, and therefore as an increment to the invested capital.

After completing the original cost appraisement, as outlined in the foregoing paragraphs, it will of course be necessary to file amended returns for previous years—deducting excessive depreciation charges (and erroneous charges to expense accounts) from the expense items as shown in the former returns. The net result will be to show a decrease in the expenses—and therefore an increase in the net profits—for the years for which amended returns are filed *but a corresponding increase* will be shown in the invested capital account and, in the majority of cases, the final returns will result in a saving from the standpoint of the Federal income tax. If this be true for the current year—and for the years for which amended returns are filed—*think what it will mean in the future.*

Other Appraisal Uses.

The new science of industrial valuation—as interpreted by the engineering appraisement—contemplates, in addition to the problems already discussed, the solution of insurance problems and the assembly of all values in such a manner that they may be used as a basis for cost accounting. These phases of the subject are comparatively simple and may, perhaps, be discussed to better advantage in subsequent installments.

The purpose of this article, the first of a series of six, has been to present a resume of the new science of industrial valuation. There have been so many new developments in connection with the kindred subjects of depreciation and valuation that it would be out of the question to discuss all of them, in detail, in the space alloted to one article. In subsequent articles, the various aspects of the engineering appraisement will be treated more in detail—especially those phases which have to do with the Federal income tax.

The Stanley Belting Corporation has recently published an illustrated booklet entitled—"A Saving for Every User of Belting." Its purpose is to state the case of the solid woven cotton belt and to correct some of the misconceptions which have arisen against this type of belt among buyers who have neglected to give Stanley belting a trial.

The book is well written and authoritative. It lists the uses for which Stanley belts are recommended, also a list of uses for which Stanley belting is not recommended.

The interesting result of a grip test made by the Mellon Institute of Industrial Research of the University of Pittsburgh for the Leather Belting Exchange, is also included.

The "substitute" idea; first and maintenance costs; what part it takes in conveyor service; a list of special installations; a table showing tensile strength of single, double and triple thickness belts, and a few letters from users are some of the features which will appeal to the practical belt buyer and user who wishes to add to his general knowledge of belts and of the Stanley belt in particular. Free copies may be secured by writing the Stanley Belting Corporation, 60 South Clinton St., Chicago, Ill.

Frequency of Card Stripping

BY JAMES ROBERTSON.

If we turn to a catalog of one of the manufacturers of carding machinery we find that only very hazy information is given as to when and how often a card should be stripped, because there are so many factors that enter into this item that it is impossible for the manufacturer to lay down a hard and fast rule. Every mill has its local conditions to contend with, which takes into account the help employed, the condition of the cards, etc., that govern the frequency of the stripping of cards to cover the particular case concerned.

Generally, it is understood that stripping covers the removal of short fibers, motes, neps, fly and other foreign substances which are detrimental to the finished yarn or fabric. Yet how many stop to think just what difference in numbers of yarn and breaking strength are to be traced to the item of how often a card is stripped? True it is that this may not matter in the making of coarse work, so much as in the running of fine work where a variation in card sliver may never be entirely eliminated, even with the larger number of doublings which are given to the finer work.

To illustrate with facts and figures how much more the drafts are effective than the doublings, the following short yarn organization is given. Of course, one will say that if there is a variation in card sliver then in the first drawing there is only a variation of one-sixth, and this is true, provided the other slivers are of the correct weight which, however, is never the case. They may compensate, but most of the time, as will be shown later, they even augment the trouble.

GENERAL ORGANIZATION FOR NO. 20s YARN.

Product	Wt. or Hnk.	D'blings	Figured Draft
Card Sliver	60 gr.	..	..
First Drawing	60 gr.	6	6
Second Drawing	60 gr.	6	6
Slubber Roving	.55 hnk.	1	4.1
Int. Roving	1.40 hnk.	2	5.1
Fine Roving	4.10 hnk.	2	5.85
Spinning	20.00 hnk.	2	9.75
Total Doublings		288	
Total Drafts Approximately			4,300.00

We readily see from this statement of figures that any variation in card sliver is drafted 4,300 times while to compensate for this the doublings only amount to 288 which makes the effective drafts dominant by 14.9 times. The variation may be only slight and may be compensated for in a later doubling, but the purpose of this article is to show how infrequent stripping will follow throughout the entire processes.

The stripping is done by starting down one line of cards and taking the cards as they come. We will say the card-hand doffs his cans just before the stripping and a little later empty cans are substituted. These full cans, which were taken just before the stripping, go to the drawing and continue on through the processes.

Then there is a doff right after the stripping which in turn goes to the drawing and follows right on through the processes being doubled repeatedly with itself usually; and any variation in itself is usually averaged.

But if there is any general difference between the cans taken before the stripping and those taken after the stripping, then we have a general difference following through the entire processes, because the cans taken before stripping are doubled with themselves and those taken after stripping are also doubled with themselves, and follow through the entire processes, therefore, any general difference finally shows up in the finished yarns and fabrics.

To determine if the cards are stripped at intervals frequent enough to warrant good running and even running work throughout the remaining processes of the mill is the purpose of this article. The general idea is given, and concrete examples of how they worked out in practice as well as in theory are to be found later on.

The general method used was to take at random some given number of cans from certain cards just before stripping and mark the number and make of the card on the can. Beginning at the top of the can and weighing separate yards of sliver down through the can to the number of twelve or more yards to get a general average, then repeating this for the number of cans taken, a good test is obtained of what sliver the cards are making before stripping. A general average of the entire group of tests will give the average weight per yard of the sliver being made.

Repeating this method on the same cards just after stripping will give the average weight per yard of the sliver being made after the cards have been stripped. Besides, the variation in weight per yard can also be determined by subtracting the lightest yard found from the heaviest yard found before stripping which will give the maximum variation per yard in card sliver before stripping. Also this may be done for each can with the result of finding which cards are making the most even sliver. This same test can be applied to the cans taken after stripping together with the maximum variation in the total of the entire tests made. Dividing these variations by the standard sliver made will give the percentage variation in card sliver.

As to the amount of variation which will affect the final yarn being made, this can be found by making a series of tests on the yarn and determining the percentage of variation of yarn number. Take, for instance, four or six bobbins from certain frames at random from the spinning room and weigh and break at least four skeins from each bobbin if possible. Tabulating these and subtracting highest numbers from lowest numbers will give variations in yarn number from which may be found the percentage of variation of the yarn numbers.

Now if the cards are stripped say twice per day, then try stripping three times per day and make the same tests and note the wide difference in percentages of variation if the regular stripping is too infrequent. However, if stripping with sufficient frequency, very little difference will be found in the card slivers, before and after stripping.

The charts and tables given in this article show the marked difference in card slivers before and after stripping where the cards were being stripped only twice per day as is done in a great many mills. The total maximum variation in card sliver before the stripping was found to be 22.3

VARIATION TESTS—CARD SLIVERS.

Standard weight 62 grains per yard—Actual average weight 60.7 grains per yard.

Can No.	1	2	3	4	5	6
Test No.	gr.	gr.	gr.	gr.	gr.	gr.
1	62.5	62.4	61.0	54.4	61.9	53.7
2	56.3	58.6	56.8	58.5	56.8	49.7
3	65.2	61.1	59.7	55.5	60.4	51.8
4	66.2	58.7	58.5	60.8	60.0	57.6
5	68.5	64.3	58.8	52.3	58.7	51.0
6	67.8	62.5	60.0	55.4	56.8	56.8
7	64.5	61.5	64.0	64.0	60.0	57.6
8	67.4	57.0	60.6	66.0	57.1	55.5
9	63.5	60.5	55.5	64.0	61.0	60.0
10	62.5	60.4	57.7	69.5	62.8	55.5
11	63.0	60.2	59.6	61.6	58.0	55.0
12	72.0	63.0	54.6	58.1	62.0	57.0
Variation	15.7	7.3	9.4	17.2	6.0	10.3

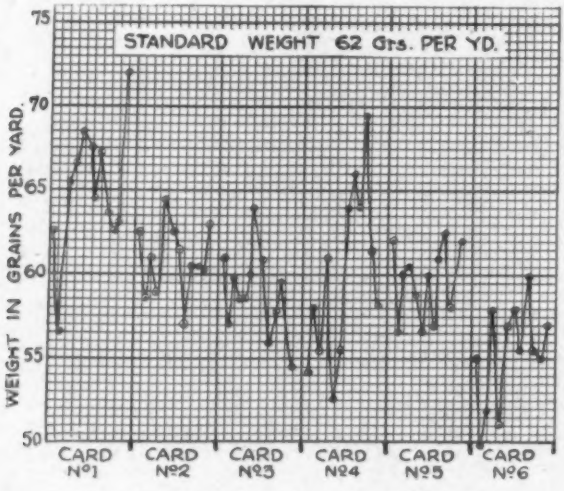
Maximum variation in six cans taken before stripping 22.3 grains.

VARIATION TESTS—CARD SLIVERS.

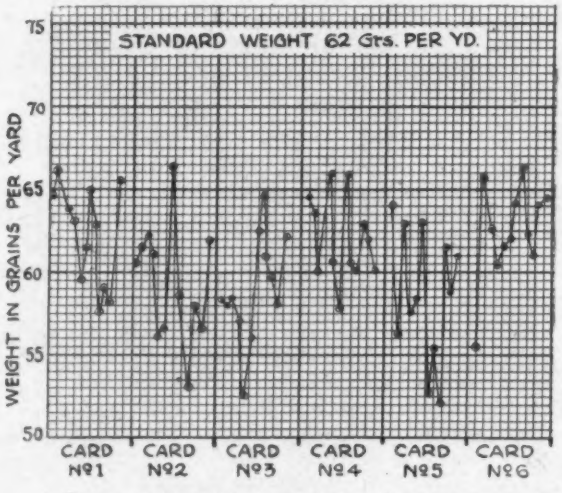
Standard weight 62 grains per yard—Actual average weight 62.5 grains per yard.

Can No.	1	2	3	4	5	6
Test No.	gr.	gr.	gr.	gr.	gr.	gr.
1	64.5	60.4	58.4	64.3	64.0	55.2
2	66.1	61.5	58.0	63.7	56.2	65.8
3	64.6	62.3	58.5	60.0	62.8	62.5
4	64.0	61.0	57.0	65.6	57.5	60.2
5	59.5	56.0	52.5	60.5	58.1	61.5
6	61.5	56.5	56.0	56.8	63.0	61.7
7	65.0	66.5	62.5	64.6	52.3	64.2
8	62.8	58.5	64.8	60.7	55.5	66.2
9	57.5	53.0	61.0	59.8	52.0	62.2
10	59.0	58.0	59.6	62.9	61.3	60.8
11	58.1	56.5	58.0	61.8	59.6	64.1
12	65.5	62.0	62.0	60.0	62.0	64.2
Variation	7.1	10.5	8.8	8.8	12.1	11.0

Maximum variation in six cans taken after stripping 14.5 grains.



TESTS ON CARD SLIVERS—BEFORE STRIPPING.



TESTS OF CARD SLIVERS—AFTER STRIPPING.

grains per yard which is 36 per cent of the standard weight of the sliver, 62 grains. Now immediately after stripping the total maximum variation was 14.5 grains or 23.4 per cent of the standard weight of 62 grains.

Following this to spinning room and without giving the exact details the maximum variation in the yarn number for the 21½s warp yarn being made was found to be 3.32 numbers and the maximum variation in breaking strength from highest to lowest break was found to be 24.5 lbs. This appears to be high but mark how high was the variation in the weight of card sliver, which evidently accounts to some extent for this variation of 15.4 per cent in yarn numbers. Another mill tested showed a variation of 31 per cent in card sliver and a variation in yarn number of 13 per cent which tends to show that where the card sliver varies, also the yarn number will vary.

To this end if the superintendent will arrange some system of tests similar to those outlined in this article, much can be done to find out if the cards are being stripped often enough for the product produced, not only in appearance but also in uniformity of sliver as well as in the final yarn numbers.

In closing it will be noted from the tables and charts given that before stripping the average weight of the card sliver was 60.7 grains, while after stripping it was 62.5 grains from 72 tests from each. This shows that the card sliver is decidedly heavier after stripping by 1.8 grains which is 2.9 per cent of the standard weight. Since the cans before stripping usually go to the drawing together, they go through the processes averaging 2.9 per cent light and show up finally as a variation in the yarn number. Much can be done to eliminate this by stripping every other card through the mill and in returning take every other card again which was not stripped on the preceding round, for then there will go to the drawing one can before stripping and one can after stripping alternating through the entire card room which will even up the difference in weights before and after stripping.

Ciba Company, Incorporated, dyestuffs, intermediates and chemicals, New York City, have taken over the entire organization of the Aniline Dyes and Chemicals, Incorporated, New York, with its branches in Boston, Philadelphia, Chicago, and Columbus, Ga. The sales personnel of the Ciba Company will be practically identical with that of the Aniline Dyes and Chemicals, Inc. This company will distribute the products of the Society of Chemical Industry and their various plants and allied works, including the Cincinnati Chemical Works, Cincinnati, Ohio.

The Nashville Industrial Corporation announce that the name of their address has been changed from Jacksonville, Tenn., to Old Hickory, Tenn., this change in name having been sanctioned by the Post Office Department.

The Practical Technic of Mule Spinning

BY ARTHUR L. BURTON.

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Before describing other parts of the copping mechanism, their settings, etc., we will examine the functions of the quadrant in a detailed manner, as with careful settings of headstock slides and a thorough knowledge of quadrant settings, a great majority of cop troubles can be eliminated. The writer thought it opportune, at this time, to give this information, which will work in with the practical man's ideas, and be of material assistance to him in working out the details of sector settings later on.

The Quadrant.

To illustrate the working of the quadrant clearly, a diagrammatic view of its action is shown at Fig. 7, 1 represents the quadrant; 2 the quadrant traveler nut; and 3-1, 3-2 and 3-3 the drum at the commencement of the run-in of the carriage, a position half-way, and then at the termination of the run-in near the beam. It will be seen that the quadrant describes an arc of a circle as the mule is winding, and in the direction in which the mule carriage is going. Hence after the mule backs-off, and the quadrant is leaning backwards of the vertical, less winding chain will be unwound off the drum 3, than will be the case after the quadrant has left the vertical. This is necessary as the copping faller wire travels to the shoulder of the cop very quickly. By stopping the mule carriage on the inward run at the shoulder of the copping rail, it will be seen by the coils of crossing threads that the spindles have only revolved from 4 to 7 times (according to the length of the loose incline). As the copping faller wire travels from the nose to the shoulder very quickly on the crossing threads (the carriage has only traveled in about 9 inches to 11 inches by this time) it will be seen that very little chain will have been unwound from the drum 3 during this period. This desideratum is obtained by setting the quadrant back of a vertical line (imaginary) and using the quadrant worm as a guide. After the copping roll has reached the shoulder of the loose incline, then the copping faller wire winds upward slowly, as the inclination of the long rail is no greater than the inclination of the short loose incline. In other words the inclination of the 10 inch loose incline is as great as the remaining 50 inches of copping rail. Therefore, the spindles must necessarily be made to revolve more and more rapidly as the copping faller wire comes upward nearer the nose, and consequently toward the smaller diameter of the spindle.

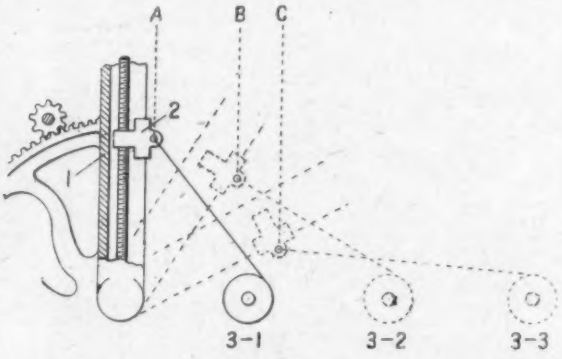


FIG. 7

It will be noticed that after the quadrant has left the vertical line it takes more and more chain from the winding drum, hence revolving the spindles more rapidly. However, it will be seen by referring again to Fig. 7 that the quadrant does not take as much chain from the drum 3 during the first half of the run-in as it does during the last half of the run-in. This is necessary because the copping faller wire is still on the larger diameter of the cop (coming upwards) whereas, during the last half of run-in the copping faller wire is on the smaller diameter of the cop, and the spindles must revolve more rapidly to take up the yarn. By measuring the distance between A and B and then comparing it with the measurement between B and C, it will be seen that more and more winding chain is unwound from the drum as the mule nears the beam. Briefly reviewing the quadrant action, it will be seen that it accommodates the mule with a varying spindle speed during the winding and does it in a wonderful manner. The points which a practical overseer should study are the possible effects on the winding by driving the quadrant through its arc of a circle with greater speed, and vice versa. That is, larger or smaller quadrant pinions being used. Assuming that he had re-set his headstock slides, and found that the counter faller was riding low, he could then let out his quadrant a tooth nearer the beam, or put on a tooth bigger quadrant pinion. However, it is advisable to have all the quadrant pinions alike in a room where all the mules are alike, and set alike. Nevertheless, time spent in testing quadrant speeds and settings amply repays, and once they are found correct they should be kept there. The length of stretch or draw should be watched as quadrant settings cannot be put on a standard basis where the draw varies in length throughout a room, even where one type of mule is used.

It will be found that with headstock slides carefully set, length of draw carefully measured and rectified, etc., the same count quadrant pinion can be used and the setting varied but little throughout the room.

Quadrant bands should always be cared for, especially should the same diameter of rope be used for long and short bands. It is really surprising what results can be obtained by a thorough understanding of quadrant settings and the proper leveling of the headstock slides.

The nosing motion is not elaborated on here for the simple reason that it is such a simple method of accelerating the speed of the spindles at the near termination of winding that it is understood by all.

Bootleg Settings.

It is highly essential that absolutely no movement be imparted to the copping faller wire other than that deputized to the copping rail itself. In other words whatever movement is given to the copping faller wire from the shoulder to the nose of the copping rail during the inward run, should be absolutely due to the rail and no other source. By examining the outline of the bootleg, Fig. 8, at H it will be seen that the part of the bootleg resting

on the bowl or roll is somewhat rounded. As a matter of fact its profile is a perfect arc of a circle. This is clearly illustrated in Fig. 8 at the right where the bootleg is shown alone. It will be seen that as the mule is nearing the beam the monkey tail K comes in contact with the unlocking bracket M. If the profile of the bootleg at H is not a perfect arc of a circle, then the copping faller wire will receive a movement independent of the copping rail, and this will result in various complications. For the sake of illustration let us imagine the profile H was straight, then the copping faller wire would be depressed when the mule was unlocking at the beam, causing a lumpy nose, cut yarn, uneven tension, and very bad readying cops. On the other hand, if the profile was too rounded, or rather rounded to a degree greater than that corresponding to an arc of a suitable circle, then the copping wire would be raised during the unlocking near the beam. This would cause (as is very common) too thin a nose, too many coils on the spindle blade just above the nose of the cop, too much breaking in the back-off owing to the large number of coils on the spindle, and easily spoiled noses after doffing.

In order to test a bootleg thoroughly for profile, stop the mule during the inward run (about half way in). Then, with an eye on the copping faller wire, move the bootleg

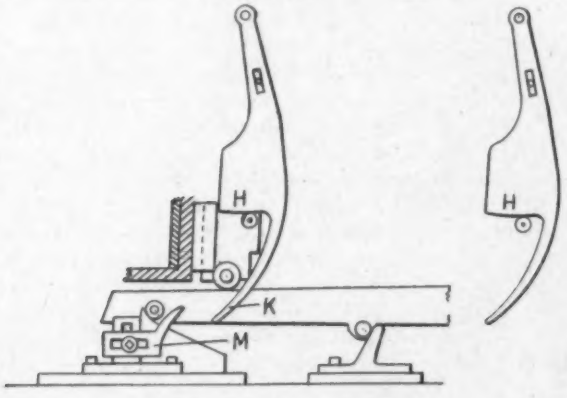


FIG. 8

back and forth on the bowl rest without unlocking the fallers, and there should be no movement of the copping faller wire during this moving back and forth of the bootleg. It will be seen that unless the profile of the bootleg is a perfect arc, the copping faller wire will be either depressed or raised when moving the bootleg back and forth.

If profile is worn the copping faller wire will raise as the mule is unlocking, causing too many coils of yarn on the spindles, with attendant complications as stated in a previous paragraph. Or the profile may be worn uneven, thus causing the copping faller wire to depress during unlocking and creating the troubles mentioned in a previous paragraph.

To remedy these troubles make a gauge similar to the illustration at Fig. 9. Let it be of wrought iron about ⅛ of an inch thick. Have a hole bored in the top the exact size of the sector finger stud (the stud joining the bootleg and the sector finger on the faller shaft) and make a slot in the lower part of the gauge. Make a steel pin or stud, threaded so that it can be attached in the slot of the gauge and securely locked with nuts and washers. This pin or stud must stand out from the gauge at least 2½ inches. By taking a bootleg off a mule and fastening it in a vise (pinching the monkey tail) this gauge can be attached to the bootleg with the sector stud and will swing freely on this. Adjust the pin or stud to the profile of the bootleg, and then move the gauge backwards and forwards. It will be seen that the pin or stud describes a perfect arc of a circle with the sector stud as a center and should touch the profile all along its face.

It will also be apparent immediately if there is any serious defect with the profile of the bootleg, and if necessary the file can be freely used. There is no danger of filing here, only be sure to get a perfect arc of the circle, then finish off with a smooth file and emery cloth. It will then be noticed that the cop nose will be more pronounced

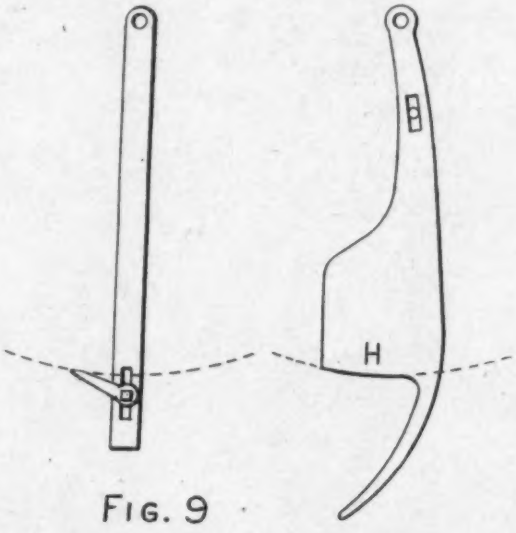


FIG. 9

in build, there will be less yarn broken in the back off, which is a bad feature on old mules in soft twist hosiery mills and mills where soft twist filling is used in the looms. The spinner will have better results with his quadrant and nose peg adjustments, less coils will be wound on the spindle, enabling a tighter backing off chain, etc. It is better to do this work at the commencement of a new set of cops, so that minor adjustments of bootleg lengthening or shortening can be done without causing any nicked cops, as would be the case were it attended to during the formation of a set of cops. At the same time, take the bowl or roll off the copping rail block (sometimes called the trail lever). Have this bowl skimmed true in the machine shop while attending to the bootleg. Be sure to have the bowls hardened again after trueing in lathe or grinder.

[This is the third of a series of articles on "copping." Others will follow.]

The general sales offices of H. A. Florsheim, general sales manager for the Gray Mfg. Co., the Arlington Cotton Mills, Parkdale Mills, Inc., Arrow Mills, Inc., Myrtle Mills, Inc., Flint Mfg. Co., and Arkray Mills, Inc. have been moved to 225 Fifth Avenue (at 26th St.), New York City. In addition to the sales offices, there will be a complete yarn-testing laboratory and suitable space for the customers of these mills.

The Effect of High Wages on Efficiency

BY F. ICACIOUS.

The largest possible production of the best possible quality at the lowest possible cost and in the least possible time—this may be assumed as the ideal of manufacturing efficiency. Now, if high wages will contribute to decrease costs by means of a larger production, then, is it not the essence of economy to pay the high wages? As William C. Redfield aptly expressed it in his book, The New Industrial Day: "As has been stated in the matter of labor cost the serious element is not the rate of wage, but the rate of output."

Manufacturing efficiency depends largely on the skill of the workers, and the efficiency of the workers hinges more or less directly on the compensation received. To make this remuneration large enough to bring the workers to their maximum productive capability, and yet not strain a concern's finances to the point where it would place the business at the mercy of a competitor is no small problem.

A solution of this difficulty is piecework. The New Standard Dictionary defines piecework as: "Work done or paid for by the piece or quantity." The expression, piecework, in this article, may be linked to a genus, under which all the varieties of piecework—straight piecework, gang-piecework, commissions, bonuses, and other forms of payment—are simply species.

The importance of piecework is recognized by all efficiency and scientific management men. Speaking of increasing the efficiency of labor in three ways, Benjamin A. Franklin, in Experiences in Efficiency, says: "For the third method, that of offering incentives to labor, there have been advanced some fifteen or twenty plans. In almost every manufacturing plant some of these plans are in use (straight piecework being the most popular), for this third method is the only one which meets labor's demand for increased pay without increasing unit labor cost, or indeed with a decrease in that cost."

To give a concrete illustration: if a worker receiving $2.00 a day turns out 100 units that brings a profit of 50 cents per unit to the manufacturer, then, if by extra inducement 130 units are turned out in the same time, it is readly seen that from the manufacturing standpoint it is economy to pay the worker $2.50 or $3.00 a day. A moment's study will show that this extra production brings the manufacturer a greater profit than the 50 cents per unit on the former production, because there is no overhead, so to say, to be charged against it. Now, it is just this special effort—this augmentation of efficiency, that piecework is designed to bring about. There seems within all workers a latent power for greater productivity; but it requires the coaxing effect of an addition to the pay envelopes to draw it out. And this increase in wages must have individuality, must possess a certain property—that of producing a given amount of work.

Piecework, of whatsoever species, serves to key up the interest. It acts as an outlet for the nervous energy stored within us all, just as the feed pipe of an engine takes care of the steam generated in the boilers. Furthermore, piecework forms a check on the previous processes: the workers immediately point out—even reject—work that is not up to a certain set standard. Thus, the work may be uneven in size, not finished properly, lack some part, or possess some other objectionable feature. By calling attention to it, this defect can be remedied; and, by doing so, the standard of efficiency at the previous process is tuned up.

Piecework, moreover, makes a worker feel that no one of his fellow-workers can "get-away" without doing his proper share of work, because each hour wasted spells a loss in pay. Under the system of standard or fixed wages, some of the workers are constantly wasting time, "soldiering" as the scientific management men call it. The principle of democracy, like the unwritten law, pervades the industrial world; and makes each worker feel that he is as good as the next one. This, interprted in the phraseology of workers, means that they will refuse to do any more work than workers who, while they received the same pay as the others, are deliberate slackers. Therefore, by keeping all the workers busy earning their wages instead of making some of them a present for "killing" their time, the ensuing larger production antomatically tends to reduce overhead expenses; and this in turn would justify a larger compensation to the workers.

The philosophy of this is readily perceptible when we consider that workers today are intelligent enough to keep abreast of the times, and that they are perfectly awake to the large melons cut by different monopolies. To them it seems that these large dividends are paid to persons who really do not do a stroke of actual work to get them.

Thus, the inference may be drawn that the object sought in piecework is the maximum productive effort of which workers are capable; and that through the attainment of this desideratum high wages may really be economical. But to bring this desirable feature about successfully through means of piecework, it is necessary (a) to set proper standards of work to be done and remuneration to be given (b) to keep up the maximum production.

Setting Standards of Work and Wages.

In establishing a piecework task, it is best to observe three classe of workers—excellent, mediocre, poor; for the reason that these are in evidence in every industry. Therefore, while efficiency and scientific management men advocate tasks based on observations of the best worker—an excellent plan when there is a surplus of the best of help—yet, owing to the chaotic condition of labor at the present time, it is advisable to steer, as it were, a center course between the two extremes. An adjusting screw does its duty better, is always in a situation to deal with an emergency, if it is placed in a middle position so that it can be moved in either of two directions.

Hence, it is best not to set a task impossible of attainment; a happy medium should be chosen, one that all average workers can achieve and keep up from week to week. Care, then, should be taken when tasks are based on time and motion studies, that the latter are carefully made. Prof. Hoxie who has investigated scientific management in many plants, and who certainly does not take as roseate a view of its possibilities as do its adherents, says in his book, Scientific Management and Labor: "If the time study is

not only thoroughly and carefully done, but is liberal in its intent, it does furnish a real basis for the assignment to all workers of definite and accomplishable tasks."

The suggestion contained in this honest opinion, coupled with an investigation of the methods of doing work in vogue, with the view of using only the best and quickest, should go a long way toward establishing a proper task.

Another thing touching on tasks that should be looked into conscientiously is the speed of machinery. Machinery running at a lower speed than that at which it could be successfully operated is in the slacker class when it comes to production; whereas overspeeded machinery usually results in an increased percentage of waste and a slump in quantity.

Consideration, also, must be given to the quality of the work. For, later on, if it is equal to or better than that used in task-setting, well and good; but if it is poorer, production may be expected to drop. If through unavoidable reasons the work comes good, bad, medium; and there is no prospect of an immediate change in this condition, the medium or average quality should be used to set the task. Workers will then know that where they lose on the poor, they gain on the good quality.

Not to be overlooked is the fact that teaching workers properly has a decided bearing in bringing a production to the level required. For instance, workers wrongly or only partly taught may grouch and grumble—even lay-down on the job—later on, when asked to do things in a different way from that which they were taught. This leads to the corollary that instructors must be reliable, honest, and skilled workers—persons who take an interest in their work. Does it not depend upon them whether or not their pupils become "laborers worthy of their hire"? The significance of teaching novices accurate habits of doing work may, perhaps, be better illustrated by quoting from William James' Psychology:" . . .we must make automatic and habitual, as early as possible, as many useful actions as we can, and guard against the growing into ways that are likely to be disadvantageous to us, as we should guard against the plague."

And furthermore, in connection with the relations of correct knowledge of doing work to high wages and lower costs, attention may be given to what L. M. Gilbreth, in The Psychology of Management, says: "Through this knowledge, the worker is able to increase his output, and thus insure the lowered costs, that provide the funds with which to pay his higher wages. . . ."

Now as to compensation. Whatever the method of payment used, whether straight piece rate, differential piece rate, bonus, or premium, the object to keep in view is that the incentive must excite the ambition of the workers to produce more. "Piecework, which makes the pay to depend on the amount of work done," writes Henry C. Adams, Ph. D., LL. D., in Description of Industry, "aims to present to workers a motive for intense work." Should it be decided to offer a special inducement for turning out the set task, pay it at frequent intervals—say every week or two. An understanding of human nature will show that this keeps the workers keyed up, because they know that they get the reward immediately. This assertion is substantiated in the report of Paul F. Brissenden, Ph. D., printed in the Monthly Labor Report of April, 1919, under the heading of Labor Policies and Labor Turnover in the California Oil-Refining Industry, and from which the following is excerpted: "It is significant that the bonus, pension, and insurance plans in force at both refineries provide for a beginning of their respective benefit payments only after the 12 heavy turnover months have passed and the great bulk of the high-frequency quitters have quit. The would-be-turnover-reducing plans seem only to begin where the turnover ends. Most of the turnover in all occupations is due to the separation from service of employees who have served less than one year—apparently the 10-day man can not be induced to stick to a job, merely by assuring him a length-of-service bonus if he waits fifty-odd weeks."

Indeed, so closely correllated are wages and labor turnover with maximum production, that increasing significance is being attached to discovering a method of adjusting the first so that the second will be reduced to a cipher—the last will naturally then ensue. Thus, in the opening sentence of his report on Labor Turnover in Cincinnati, published in the Monthly Labor Review, March, 1919, Emil Frankel writes of labor turnover. "On account of the vital importance of the subject, the Bureau of Labor Statistics has, for some months past, conducted comprehensive studies of the extent and causes of labor turnover and of the methods and policies adopted for the stabilization of the working force."

It will not be irrelevant here to say that rate cutting, like the bad habits that William James cautions us about, should be guarded against as "against the plague." Touching this matter of rate cutting, it may be pertinent here to quote William C. Redfield, in his book, The New Industrial Day: I know a factory in which the product was doubled in two years without adding a man or without adding a machine. And this is the way it was done: it is a very interesting experience in labor cost. The men had been paid on day work. The labor men have, and they properly have, a horror of piecework, as it is commonly administered, because, I am sorry to say, manufacturers have so abused the piecework principle that the laboring men have justly come to fear it. As piecework is handled in many factories it ought to be hated, as it is hated, but in this particultr factory the head of the concern had the idea that he could save by guaranteeing his men a high wage. He became convinced that he could save by paying a high wage, and he said to the workmen, 'We will guarantee your day rates; you shall always earn day's pay. We will also guarantee that your piecework rates shall not be cut. We will agree with one another that obvious mistakes will be corrected either way, but if you earn large pay, understand, your piecework rate shall not be cut.' "

Keeping Up Maximum Production.

Having expounded the desirability of piecework and shown the need of proper task-setting and compensation, the proposition of keeping the maximum production going looms up.

Here is where the keeping of records of daily attainment for each worker is important. Each individual production can then be followed up, and should there be a drop the cause can be immediately looked into. If due to grievances of any sort, these should be ironed over as smoothly as possible; for grievances, like weeds crowding out desirable vegetation, will soon choke production if not eradicated. Post the records conspicuously—for instance, on walls or posts near the work—so that the work-

ers can have daily access to them. This stimulates competition.

Anyone who has ever attempted to hurry along a crowded downtown street can speak of the uselessness of such a procedure. The greater the hurry the less the distance covered, apparently. This is exactly the case where workers are subjected to undue interference with their work, such as passages too narrow, over-crowded, blocked with various impedimenta—trucks, boxes, and the like. Keep the road to maximum production clear.

Whether workers should convey their work to their respective places, and then carry their finished product away or whether this should be done for them must receive careful study. If the workers can attend to this without interruption to their productive capabilities, it is an economical system; but if production were to be curtailed, then it is better to have the work taken to and from them. Should the latter method prevail, attention must be given to the smooth passage of work to the workers—they must not be kept waiting for material to work on, nor suffer delay in having their finished product removed. Either or both reduce output.

At this point it may be advisable to mention the matter of supervision. Most everyone has, at one time or another, read statements by different writers on education indicating that the smaller the classes an instructor has, the better the instruction each individual in that class receives. This applies equally in industry; intensive supervision brings the management and workers into closer contact; it keeps the managerial end posted more thoroughly, and puts the workers in immediate touch with the ganglia of management; it also leads to the better selection of workers, and to the distribution of misfit workers to other sections more adaptable to their abilities.

This problem of misfit workers and their decreased efficiency was recognized by Prof. Munsterburg, as is shown in the following extract from his book, Psychology and Industrial Efficiency: "If every place in the economic world were filled only by those who are perfectly adapted by their mental traits, it would be much less difficult to get efficient work from every one. The fact that so many misfits are at work makes it such an urgent necessity to find ways and means by which the efficiency can be heightened."

However, even the best of workers cannot bring their efficiency to its zenith if handicapped with dilapidated, neglected equipment. Broken-down machinery will no more produce than a rooster will lay eggs. It would be well, however, to watch Argus-eyed that repairs are promptly made. A system of signals may be advisable in connection with repairs so that the repair man's attention can be drawn to the defect without causing the workers to leave their respective places. As in repairs or replacements, so also in improvements of methods or machinery, eternal vigilance—that shop-worn and hoary combination—may still be made to work toward a crescent production.

Here, too, is where keeping the industrial ear close to the ground may produce results. By this is meant: listening to the suggestions of workers; for they are the ones who must actually use the methods of doing work, and who must also operate the machinery.

Again, there are certain potential production-leaks that require looking after. Among these are late arrivals, early leavers, and loungers at sinks during washing periods. Following these matters daily will often, without friction, bring about the stone and steel foundation in the following quotation, taken from the chapter on Discipline in George H. Shepard's book, The Application of Efficiency Principles: ". . . . strength to achieve is lacking, unless there is a stone and steel foundation of obedience to orders." When workers are discontented and inclined to disobey orders, find the cause; for, like a rotten apple, one or two may contaminate all their neighboring fellow-workers. If due to a faulty condition, correct it, if, however a worker is a natural born malcontent, then, like a surgeon who removes the danger to a patient's life by cutting out a diseased part bodily—discharge the worker. But it must always be remembered that anyone can discharge a worker, whereas not all possess the ability to make-over such a one.

If one ounce of prevention used to be considered worth a pound of cure, would it be amiss, here, to venture that a mickle of accident prevention may save a muckle of production loss? To this end first aid rooms with a trained nurse in attendance are becoming an institution for the treatment of minor injuries and ailments, as well as for working in conjunction with the employment department to keep workers steadily employed. Further, in line with this movement, a standard type of wearing apparel might be worth considering, both from the angle of safeguarding against injuries and that of increase of working efficiency.

Who is it that has never heard people remark that a dull, rainy, stormy day makes them feel blue; whereas a clear, bright, sunny day causes their spirits and ambitions to soar? So, too, it is with the surroundings of workers. If they have plenty of light, with air in good condition, tidy floor, they are, naturally, more contented and in a better humor to work than where the light is poor, the air worse, and the floor synonomous with pig-sty. On the other hand, when workers leave their tasks, congenial as the conditions existing there may be, and go into homes that are everything that hygienic homes should not be, all the good of their industrial environment is dissipated. Indeed, during the war, the government found the housing of labor so important that the Bureau of Industrial Housing and Transportation of the U. S. formed community committees to correct conditions such as these: "War workers were thus driven to housing accommodations that were unsanitary and cramped. The exorbitant rentals for such quarters and the constant danger of still higher costs, enforced by the threat of eviction, created discontent and worry and seriously impaired industrial efficiency." The above is excerpted from an article on Housing in the Monthly Labor Review, March, 1919.

The way to a man's heart leads through his stomach. Arguments may be advanced to prove or disprove this old saying, but surely no one will refute the statement that eating, like reading, maketh a full man; and that a person naturally labors more efficiently on a full stomach than on an empty one. Therefore, if an industrial concern has a large percentage of employees who reside at a distance from the workplace—too far to go home for the noon meal—it is advisable to consider installing a luncheon or restaurant system. What is that injunction about casting

bread upon the waters? In this case increased efficiency is expected in return.

All work and no play making Jack a dull boy applies to the industrial system of today. A combination playground and athletic field close by the plant will take care of the natural exuberance of the younger workers and furnish inspiring amusement for older ones. O. W. Douglas, manager of the Playground Department of the Hill-Standard Mfg. Co., Anderson, Ind., writes in the October, 1919, issue of COTTON: "Scores of industrial concerns throughout the country have seen the value, not only of proper recreation for their employees, but also for all of the children in their respective communities. The concerns include the large steel, coal and rubber companies, as well the southern cotton mills and many other industries. And it pays them, not only by creating a community asset, but in actual increased efficiency and loyalty of their employees."

Cooperative ventures, too, are becoming a popular scheme for the stabilization of labor—particularly that form of cooperation known as a building and loan association, whereby the employees are enabled to purchase their homes by paying so much per month.

Thus, then, while piecework has here been suggested as the medium for making high wages practical and profitable for both workers and employers, the cooperation of the employer, naturally, is necessary in the matter of setting the proper standards of work. And furthermore, his continued oversight in regard to the working conditions, the environment, homes and welfare of his workers is indispensable to the attainment of that acme of manufacturing efficiency: the largest production of best quality at smallest cost and time to the manufacturer—and high wages to the workers.

World Cotton Conference.

Preparations for the second World Cotton Conference, which is to be held in Liverpool and Manchester, June 13 to 22, are assuming their final shape. Papers on a number of subjects pertinent to the industry have already been arranged for and others will be selected and designated within a short time. A perusal of the list of speakers thus far secured will show that each subject is to be handled by an authority in that particular field of work, thus insuring an authoritative discussion on each subject. All papers will be distributed to the delegates in advance of the opening of the conference. No paper will be read in full, but in due order its contents will be outlined to the conference by its author or authors, preliminary to a discussion of the topic with which it deals. The suggestions and recommendations resulting from each discussion will, at its conclusion, be referred to the appropriate committee, by which they will again be considered and discussed. Following are the papers for which definite arrangements have been concluded:

How Can the Quality of the American Cotton Crop Be Improved and the Supply Kept Adequate to the Demand?, David R. Coker, Hartsville, S. C.

Cotton Growing Within the British Empire, W. B. Himbury, British Cotton Growing Association.

Needed Reforms in Compressing, Ginning and Baling, Albert L. Scott and F. S. Blanchard, Boston, Mass.

The By-Product as a Stimulus to Production, Louis N. Geldert, Interstate Cotton Seed Crushers Association, Washington.

Cotton Warehousing; A Growing Need, Captain William P. White, Lowell, Mass.

Universal Standard for American Cotton, W. R. Meadows, Department of Agriculture, Washington, D. C.

Financing American Cotton for European Use, Willis H. Booth, Guaranty Trust Co., New York City.

Research Problems of World Import, Dr. A. W. Crossley, Director of Cotton Research Association, Manchester, England.

International Comparisons of Cloth Prices, Dr. Melvin T. Copeland, Bureau of Business Research, Harvard University, Cambridge, Mass.

Characteristics of Cotton Required by the Spinner and Present Defects in the Raw Material, William Howarth, British Fine Cotton Spinners' Association, Ltd.

Yarn and Cloth Contracts, John Taylor, Blackburn.

Hours of Labor in the Textile Industry, Albert Thomas, Director of International Labor Office, Geneva, Switzerland.

Factory Accidents and Their Prevention, John Jackson, British Inspector of Factories.

It is planned also to have papers prepared on timely subjects relating to transportation, the finishing of cotton goods, and the manufacture of textile machinery.

As has been previously indicated, Henry L. Mulligan, 10 Congress St., Boston, is serving as American transportation agent for the conference. The White Star liner Adriatic, selected to convey American delegates to the conference, is one of the largest and finest steamers in the Atlantic service. It will leave New York on June 1, and land its passengers at Southhampton on June 10, where special train service will be provided to Manchester and Liverpool.

There have been several attractive tours arranged, to be taken after the conference, some of which include trips on the Continent and over the battlefields and other points of interest, and a number of the American delegates to the conference will no doubt take advantage of these. Each tour will be under the direction of an experienced travel manager and the costs will include transportation, hotels, sight-seeing and other necessary expenses, on a strictly first-class basis.

It was announced in the February number that Lord Emmott, of Oldham, will preside at the conference in lieu of Sir A. Herbert Dixon, who was elected president at the New Orleans meeting in 1919 and whose death occurred last December. Lord Emmott is an honored figure in English public and industrial life. For many years he represented Oldham in the House of Commons, where he was chairman of the Committee on Ways and Means, and for three years following 1911 he was Under-Secretary of State for the Colonies. During the recent war he served in succession as commissioner of works and as director of the war trade department. In business life Lord Emmott is head of the firm of Emmotts and Wallshaw, and brings to his new task, in connection with the World Cotton Conference, great ability and long experience in many fields. He takes a broad-minded view of everything affecting industry, particularly with regard to the relations between capital and labor.

The improvement taking place in the textile industry is being reflected in the increasing sales of the dyestuff makers; for instance, the Atlantic Dyestuff Company's sales of dyestuffs and intermediates for January were 76 per cent greater than for the month of December, 1920.

You can generally spot a liar by the vociferousness with which he proclaims his honesty.

Soap

BY WILLIAM B. NANSON.

The use of rosin soap in the ash or lye boil in conjunction with the lime boil process of bleaching is an essential part of the process. Rosin soaps, as we have already indicated, possess very marked lathering and detergent qualities, but their use demands very thorough washing with soft water, if a good color is to be the permanent result in the finished goods. In the opinion of the writer, the use of rosin in any form is objectionable in the case of fine goods or those requiring a perfect white. However, in the case of coarse sleazy goods, it does contribute somewhat to cause them to finish up firmer in the final analysis.

The effects produced by hard water in conjunction with rosin soaps have already been referred to. With hard water it is quite impossible to remove them from the goods and very small quantities of calcium or magnesium rosinates will deleteriously affect the color of fine goods. Even with distilled water it is difficult to completely remove rosin soaps from cotton goods, and in a series of tests made under identical conditions it was conclusively proven that in no case was the color (white) so good when rosin was used. It may, therefore, be safely concluded that rosin soaps, even when used with other soaps as a five per cent mixture, always tend to develop color on bleached goods and that soaps containing rosin are particularly unsuitable for hard waters. In fact, only soaps whose fatty acids are of a light color should be used when the water is hard; but with a soft water, many cheap dark colored soaps are comparatively safe. Perhaps the chief point at which these soaps are deposited on the fabric is in the washing after boiling (or scouring). When a fabric has been scoured it is necessary to wash out the last remaining traces of soap if the color is to "stand" well.

Rosin soaps are compounds of soda or potash with the complex acids (chiefly abietic) of which coniferous resins consist. Their formation is not due to a true process of saponification but to a simple combination. They occupy, however, an important place in compound soaps. Yellow soap, for instance, consists of a mixture of any hard fatty soap with a variable proportion—up to 40 per cent or more—of rosin soap. Rosin soap, by itself, has a tenacious gluey consistency, and its intermixture in excess renders the resulting compound soft and greasy. The ordinary way of adding rosin to a soap consists in stirring in small fragments into the fatty soap in the stage of clear boiling, but a much better result is obtained by separately preparing the fatty soap and the rosin soap, and combining the two in the pan after the underlye has been salted out and removed from the fatty soap. The compound then receives its "strengthening" boil, after which it is "fitted" by boiling with added water or a weak lye, continuing the boil until, by examination of a sample, the proper consistency has been reached. On settling the product forms three layers: the uppermost is a thin crust of soap which is worked up again in the pan; the second is the desired soap; next there is a dark colored weak soap termed "nigre," which, because it contains some soap and alkali, is saved for further use. Underneath these there is a solution of alkaline salts with a little free alkali. The upper layers having been removed, the desired soap is ladled out or run off to a crutcher, which is an iron pan provided with a stirrer. It is stirred in this until it becomes ropy, and it may then be run out or ladled out into frames or molds to cool and solidify.

Rosin is used also for cheaper kinds of soft soap just as in the case of the hard soap just mentioned, but I would say, for reasons already stated, rosin should be avoided in the manufacture of soaps for textile purposes and its presence must be considered as distinctly lowering its value, in fact it should be classed as a distinct adulteration.

The rosin for the mixtures referred to may be prepared by either of the following two methods:

372 pounds caustic soda 28 degrees Tw., 225 pounds rosin, 225 pounds cocoanut oil. Use the cold process, and before putting in the frames cut with a salt solution of 24 degrees Be.

The best way, however, is to boil rosin in a soda ash liquor and when dissolved, salt it out with common salt. It will float on the top of the liquor as a soft brown soap and can be ladled or skimmed off.

Calico printers use soap in large quantities in the final processes of washing and cleaning the printed goods, and, so far as the alizarine and mordant dyes are concerned, soap helps to brighten these and fix the color. A soap liquor of about 1½ pounds of soap to 50 gallons of water is the one usually employed. The most suitable soaps to use for soaping printed calicoes and similar goods should be readily soluble in water, so oils offer the most advantages. They require to be kept neutral, as any free alkali is liable to alter the tints of some colors and cause others to run, which is a serious fault. Further than this, they should not leave a disagreeable odor on the goods. Marseilles soaps answer the purpose best. These as a rule are of a green color, being manufactured from the commoner grades of olive oil. They maintain 62 to 64 per cent of oil, with an equivalent proportion of alkali and water. Tallow soaps must not be used. The soaps employed should, moreover, not contain fillings of any description.

In the silk industry soap has long been used in the ungumming or boiling off of the raw silk, and in many processes of silk dyeing. In the woolen industry it is employed in milling or fulling of woolen fabrics and also in the scouring or cleaning of the wool.

Soaps used for the milling or fulling of woolen cloths after they have been dyed should be easily soluble in water, and there should be neither free alkali nor free fat in them. The latter is essential in order to insure that no change in the color of the dyed goods shall take place, also that the colors will not run; further, that the fiber shall be left soft and supple and firm to the hand. Well made soft soaps are the most suitable to use, especially those made from olive, cotton, or other liquid oils. If a soap containing any undue quantity of free caustic alkali be used for scouring raw wool, it will have an ill effect upon the wool fiber, spoiling its surface by raising the scales and removing the gloss. For the highest class of wools a soap that is neutral—and by preference a neutral potash soap—is the best for the purpose.

The raw or unbleached cotton cleanser always employs an alkaline soap, while for the final cleansing of printed cottons a neutral olive oil curd soap suits the case admirably for in this case free alkali and rosin are objectionable. Olive oil soap free from caustic alkali but often containing carbonate alkali is also used in cleansing silk, although hard soaps free from rosin are often used on account of their cheapness. For the removal of tarry stains, pearl ash (carbonate of potash) soaps answer well and for cleansing carpets oxgall soaps are the best to use.

The dyer of cotton and silk goods utilizes soap in pretty large quantities also, though it is very seldom used in the dyeing of wool. In the dyeing of numerous direct colors on cotton it is often used to the extent of three per cent of the cotton. No difficulty arises here, however, in the selection of the soap to be used, practically any good well made soap will answer the purpose.

Soaping after the dyeing process is always resorted to in the dyeing of Turkey reds, alizarine reds and para reds on cotton. It exercises a very important influence upon the results obtained and the process is one which is invariably carried out with a considerable amount of care and discrimination in all large, up-to-date works. It has a marked effect in brightening the colors and preventing them from "running" or rubbing off.

In the finishing of cotton prints and other cloths there is used a soluble oil which is in reality a solution of a castor oil soap, this must not be confounded with Turkey red or alizarine red oil which is a sulphonated castor oil.

Castor oil is different from other oils in that its soaps will dissolve with ease in water to a clear solution which will contain as much as 25 per cent of fatty matter and still be liquid. This is utilized in the finishing industry to impart a full, firm and yet a soft and pliable handle to cotton cloths, and there are not many, if any, substances which will be found to answer the purpose more satisfactorily than castor oil soap.

Castor oil soap may be made as follows: Mix 20 pounds of castor oil of the first pressing with 17 pounds caustic soda lye 36 degrees Tw., and boil for one hour. Allow the soap to cool for about five hours and then add four pounds and 14 ounces hydrochloric acid 32 degrees Tw., boil for half an hour and allow to cool, and siphon off the salt solution.

Soda forms much harder and firmer soaps than potash. In fact, all ordinary so-called hard soaps contain soda as a base. The hardest commercial soaps are those made with soda and fatty matter containing much stearic acid, such as tallow; and the softest are those made with potash and oils containing principally olein, linolein or ricinolein. Potash soaps are highly deliquescent, 100 parts of potassium oleate exposed to the air absorb 162 parts of water and 100 parts of potassium palmitate absorb 35 parts, whereas 100 parts of sodium stearate absorb only 7½ parts. These quantities may vary with the condition of the atmosphere, but they show comparative results.

Many soaps, notably those made with cocoanut oil, have a remarkable property of retaining a very high percentage of water (70 to 80 per cent) and still remaining fairly hard. Soaps are insoluble in solutions of alkaline salts, and also in strong solutions of caustic alkali, hence, in the process of manufacture the potash or soda used must not be more than of a certain strength, otherwise the partially formed soap will be thrown out of solution. On the addition of common salt to a solution of soda soap, the latter separates out as a curdy mass and rises to the surface. This property is utilized on the large scale for separating the soap from the excess of alkali and the impurities in the lye employed. The glycerin liberated by the decomposition of the fatty matter also remains in the alkaline solution. The operation is usually termed "salting out." For the production of a pure neutral "curd" soap, the solution is run off, the soap dissolved in a fresh quantity of water and the operation of salting out is repeated.

The methods used for producing soap may be classified as follows: (1), by the direct saponification of fatty acids by caustic or carbonated alkalis; (2) by saponifying neutral oils and fats (glycerides) in the cold with exact quantities of strong solutions of caustic alkalis; (3) by boiling oils and fats in large open vessels with comparatively weak solutions of caustic alkali, with subsequent concentration to a semi-solid mass; (4) by boiling as in class 3 but using caustic soda only; with subsequent "salting out' and elimination of the glycerin.

The first three processes are used for both potash and soda soaps. Soaps made according to methods (1) and (4) contain no glycerin unless added direct. Those made by methods (2) and (3) retain the glycerin formed during saponification.

Process 1. The fatty acids employed are almost exclusively those obtained as a by-product in the manufacture of stearic and palmitic acids for candles. The liquid portion known as "red oil" and "oleine" consists essentially of oleic acid, with small quantities of stearic and palmitic acids. When prepared by the autoclave process, the product often contains more or less undecomposed glycerides as well as small quantities of hydrocarbon oils. If glycerides are present in notable proportions, it is best to saponify with *caustic* alkalis. Large quantities of soap, however, are made from "oleine" and potassium or sodium *carbonates* for washing raw wool, yarn and cloth. A solution of potash soap suitable for washing wool may be readily obtained by boiling 100 pounds of "oleine" and 25 to 30 pounds of pure potassium carbonate (or an equivalent amount of commercial pearl ashes) with about 100 gallons of water in a large iron tank; 25 pounds of potassium carbonate are required to produce a neutral soap, but for most kinds of work at least 30 pounds may be used with advantage. A potash soap is admittedly superior to a soda soap for washing wool and woolen fabrics, but on account of cheapness soda is more frequently employed—especially for low class goods. To produce a neutral soda soap with 100 pounds of oleine, about 19 pounds of pure sodium carbonate are required, but in actual practice at least 25 pounds (soda ash 58 degrees) are usually taken.

"Oleine," in addition to its direct use, is also largely employed in conjunction with other oils and fats for making soaps by process 3.

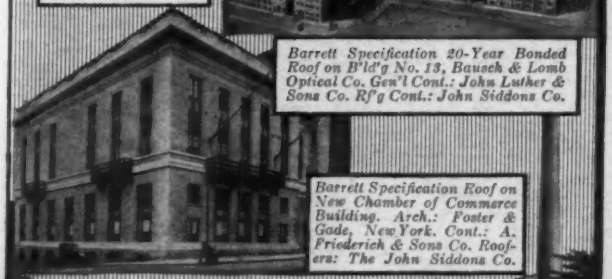
Process 2. In making soaps by the "cold process" the greatest care must be taken to employ the exact amount of caustic alkali required for saponification. The alkali used must also be pure and free from carbonate. This method is often employed for the cheaper kinds of toilet soaps though of late years a considerable amount has been made for scouring purposes in the textile industries.

Barrett Specification Roofs

Bonded for 20 and 10 Years

Barrett Specification 20-Year Bonded Roof on Utz & Dunn Co. Shoe Factory. Arch.: Leon Stern. Roofers: W. Stuart Smith Co

Barrett Specification 20-Year Bonded Roof on Old Chamber of Commerce Bld'g. Arch: Leon Stern. Cont.: A. Friederich & Sons Co. Roofers: Knowles & Peck Co., Inc.



Barrett Specification 20-Year Bonded Roof on B'ld'g No. 13, Bausch & Lomb Optical Co. Gen'l Cont.: John Luther & Sons Co. Rf'g Cont.: John Siddons Co.

Barrett Specification Roof on New Chamber of Commerce Building. Arch.: Foster & Gade, New York. Cont.: A. Friederich & Sons Co. Roofers: The John Siddons Co.

Barrett Specification 20-Year Bonded Roof on J. Hungerford Smith Factory. Arch.: Leon Stern. Cont.: John Luther Sons Co. Rfrs.: Knowles & Peck Co., Inc.

Barrett Specification 20-Year Bonded Roof, Wollensak Optical Co. Arch.: J. Foster Warner. Cont.: A. Friederich & Sons Co. Rfrs.: Knowles & Peck Co., Inc.

Barrett Specification 20-Year Bonded Roof, Taylor Inst. Co. Arch.: J. F. Ancona. Cont.: Gorsline & Swan. Const. Co.: A. Friederich & Sons Co. Rfrs.: Knowles & Peck Co., Inc.; W. Stuart Smith Co., Inc.

Barrett Specification 20-Year Bonded Roof, shops of General Railway Signal Co. Eng.: J. F. Ancona. Gen'l Cont.: Gorsline & Swan. Roofing Cont.: W. Stuart Smith Co.

All Over Rochester—

AMERICA goes to Rochester for kodaks, for lenses, for thermometers, as well as for many other products. But Rochester, like all the rest of America, comes to Barrett for roofs.

The supremacy of these roofs for permanent flat-roofed buildings is so generally recognized that *"as good as Barrett"* is the claim offered on behalf of other kinds of roof construction.

The Barrett Specification Roof is the *one* roof that has withstood the test of time—and time alone determines roof values. Figured on *cost per year of service*, no other roof is so economical.

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A SURETY Company Bond, absolutely protecting the owner from maintenance expense, is issued free of charge on Barrett Specification Roofs of 50 squares or larger, in towns of 25,000 or more, *and in smaller places where our inspection service is available.*

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The Barrett Specification Type "AA" 20-Year Bonded Roof represents the most permanent roof covering it is possible to construct, and while we bond it for twenty years only, we can name many roofs of this type that have been in service over forty years and are still in good condition.

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Full details regarding these Bonded Roofs and copies of The Barrett Specification sent free on request.

The Barrett Company

New York	Chicago	Philadelphia	Boston	St. Louis
Cleveland	Cincinnati	Pittsburgh	Detroit	New Orleans
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THE BARRETT COMPANY, LIMITED: Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

The following quantities are recommended for making good potash soap by the "cold process" for washing wool: 50 pounds of good caustic potash are dissolved in five gallons of water and allowed to cool. The solution is then gradually poured into a vessel containing 200 pounds of Gallipoli olive oil during constant stirring with a flat wooden stirrer about three inches broad. The stirring is continued until the oil and potash have become thoroughly mixed when the vessel is covered and put in a warm place for a day or two. The combination between the oil and the alkali commences a short time after mixing, and is accompanied by a considerable rise in temperature.

The quantities given produce an almost neutral soap. For anything but the finest work the amount of oil may be reduced to 180 pounds. It is preferable, however, to make a neutral soap as given and then afterward treat it with potassium carbonate in the proportion of 1 to 3 per cent.

In place of olive oil, it is possible to use cottonseed oil, castor oil, etc., or mixtures of these oils.

A neutral hard soap can be made by the cold process in the following manner: 150 pounds of tallow, palm oil, or cocoanut oil are melted and brought to a temperature of 40 degrees Centigrade and a solution of 20 pounds of pure caustic soda dissolved in 75 pounds of water at a temperature of 22 degrees Centigrade gradually added during constant stirring. The mixture is then poured into a soap frame and covered up, and put in a warm place for a few days.

Process 3. Soft soaps are most usually made by boiling olive, cottonseed, linseed, rapeseed, hempseed and other oils with caustic potash lye. The oil is run into the "pan" to the extent of about one-fourth its capacity, and the requisite amount of a solution of caustic potash (containing a little carbonate) of specific gravity 13 to 16 degrees Tw. added at the same time. The mass is boiled for some hours until saponification has taken place, the completion being determined by the appearance which small samples present when allowed to cool on glass plates. If more alkali is required, a solution of caustic potash ranging from 24 to 40 degrees Tw. is gradually and cautiously added and the boiling continued. The direct steam (if used) is then turned off and a portion of the water evaporated by boiling with fire or "close" steam only. The finished soap is then run into casks while still hot.

"Hydrated" (i.e., soft) soda soaps are made in much the same manner as "soft" potash soaps, using an equivalent amount of caustic soda lye in place of caustic potash. The fatty matters used comprise tallow, palm oil, cocoanut oil, lard, oleic acid, castor oil, olive oil, etc. The amount of uncombined alkali in such soaps, although varying greatly, is usually much less than in potash soft soaps. Soaps of this class containing an excess of alkali are used largely for scouring purposes. Others which are neutral or contain an excess of fatty matter are extensively used as "softeners" for treating dyed goods. For this purpose palm oil is the principal fatty matter employed. Soluble oil is a soap of this kind made from castor oil and thinned down with water.

Process 4. Hard soaps made by open pan boiling, where the glycerin is eliminated by "salting out," are manufactured on an enormous scale. Probably 90 per cent of the total soap produced in English speaking countries is made in this way. The principal varieties are known as curd, mottled and yellow. Almost all kinds of fatty matters are employed, and for "yellow household" soaps rosin is also largely employed along with tallow, palm oil and other fats.

Curd soaps should be free from rosin. They are of great importance for milling and scouring dyed fabrics, and for most purposes should be neutral, excess of alkali being especially injurious to woolen goods or to calico prints.

The employment of certain ammonium salts for removing the excess of alkali from soaps depends on the circumstance that potash and soda, as also potassium and sodium carbonates, possess the property of displacing ammonia from its compounds with acids. For example, ammonium chloride combines with sodium carbonate to form sodium chloride and ammonium carbonate; consequently, if ammonium chloride be added to a soap containing free carbonate, the result is a neutral soap, together with a volatile alkali, which has no injurious effect on either wool or printed calico.

The process of effecting the elimination of surplus alkali may be applied to soft soaps (freed as far as possible from any large excess of alkali by exercising due care in manufacture) by thoroughly crutching in an appropriate amount of the ammoniacal compound before barrelling the soap. All soaps treated in this way emit a smell of ammonia upon opening the barrels. Soaps de-alkalized by this method are well suited for use where an article devoid of excess of free alkali is of importance.

Similar remarks apply to "oil" soaps for fulling purposes made from oleic acid, etc., the de-alkalizing agent being crutched in as late as possible consistent with due admixture, and the mass allowed to solidify.

For certain purposes and more particularly for clearing printed calicos after dyeing with mordants, and similar operations carried out with other cotton goods, an excess of alkali amounting to only 0.1 or 0.2 per cent is injurious, certain colors being more prone to alteration under such treatment than others, accordingly the calico printer requires for such a purpose a soap as nearly approaching to absolute freedom from excess of alkali as possible. This result is readily attainable by treating the soap before solidifying in the frames with the proper amount of ammoniacal salt, the minute amount of ammonia retained in the bars, after cutting and stacking, exerts a far less injurious action than the corresponding quantity of fixed alkali upon sensitive colors.

In some cases, after dyeing, the material—especially wool—contains a considerable amount of free acid, and if a perfectly neutral soap were used, a portion would be decomposed, and free fatty acids deposited upon the fiber. In such cases, therefore, a soap containing ¼ per cent of free alkaline carbonate, if properly used, will not injure the colors, and, as a matter of fact, gives a better result than one that is absolutely free from excess alkali.

The oils and fats most suitable for the manufacture of soaps by the cold process are those belonging to the cocoanut oil group, as they possess the property of being converted into soaps on being stirred together with concentrated caustic soda solutions of approximately 1.35 specific gravity. The plant required for this manufacture is of the simplest construction and merely consists of

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COTTON MACHINERY

an iron or wooden frame into which the fat, previously brought to a temperature of about 35 degrees Centigrade, is placed; the fat is then stirred, while an accurately measured quantity of caustic soda of 1.35 specific gravity is run in. The frame is covered and allowed to stand, when the mass develops some heat, sufficient to complete the process of saponification within 24 hours.

The simplicity of this process has led the market at times to be flooded with "cold" soaps prepared by unskilled persons, so that these soaps contained a considerable excess of caustic soda, or unsaponified fat side by side with free caustic soda. The prejudice on this account which has arisen against this class of soap is, however, unfounded as it is not difficult, by careful working, to prepare practically neutral soaps. For this purpose the quantity of caustic soda required for complete saponification must be calculated from the saponification value of the fatty material. These soaps are not readily "salted out" by brine; hence they can be used for washing with sea water and comprise the class known as "marine soaps."

By incorporating with cocoanut oil certain proportions of olive oil, lard, tallow, etc., these oils and fats can also be saponified in the cold.

Soaps so prepared naturally contain the whole amount of glycerin that results from the saponification of the oils and fats.

The theoretical composition of a soap made from cocoanut oil, having a saponification value of, say, 240, by the cold process, is the following:

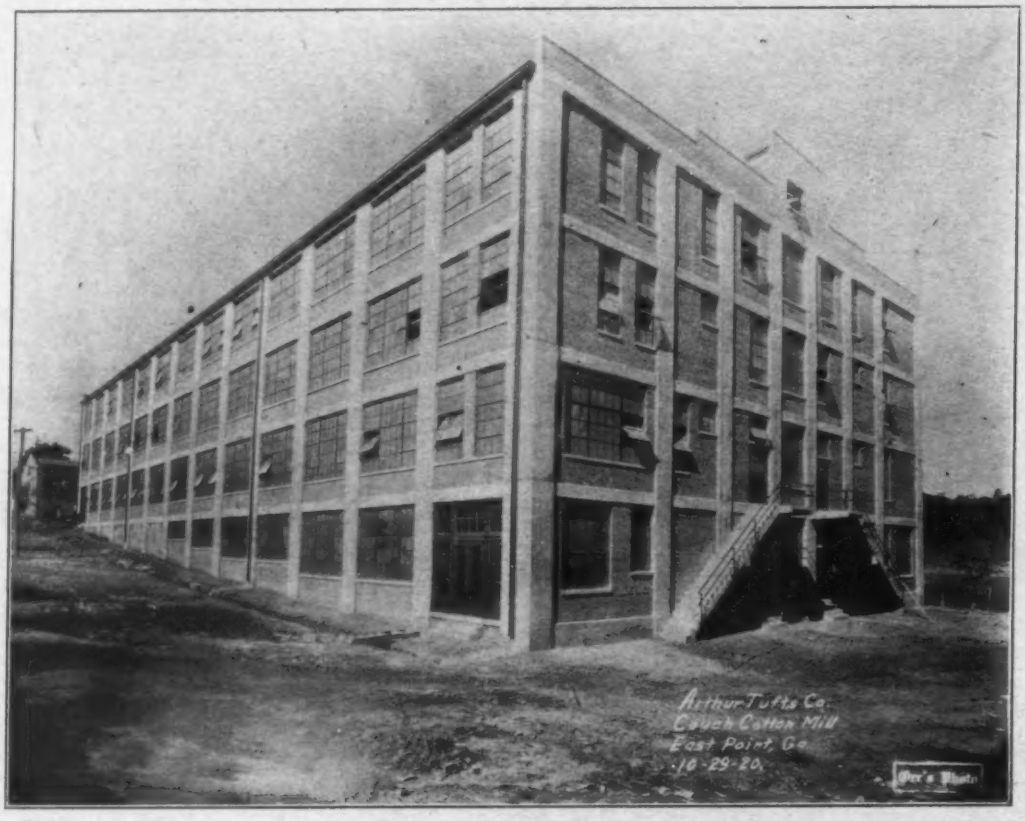
Fatty anhydrides	54.50 per cent
Combined sodium oxide Na_2O	8.86
Glycerine, water and small quantities of inorganic salts	36.64
	100.00

Cold soap cannot be conveniently made on a practical scale from fatty acids or soap stock fatty acids, as in consequence of the immediate combination of fatty acid with caustic soda lumps are formed which occlude the uncombined materials. For this reason, fats containing notable amounts of free fatty acids are unsuitable for the manufacture of cold soaps.

Castor oil is similar to the fats belonging to the cocoanut oil group by being able to form "cold" soaps. The further property of castor oil of imparting translucency to soap has also been made use of in the manufacture of inferior cold soaps, and complete transparency is obtained by the addition of sugar solutions together with sodium silicate solution. Large quantities of cheap transparent soaps of this kind are made, but they must not be confounded with the high class transparent soaps which will be described later on.

(This is a second of a series of articles on this subject. Others are to follow.—Ed.)

The 1920 comparative cotton goods chart, together with a statistical chart showing the highest and lowest prices on staple cotton fabrics for the last seven years, has been issued by Louis Lowinson & Company, New York City.



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ATLANTA, GA. **BALTIMORE, MD.**

Where Does Discipline Begin?

BY BOYD FISHER.*

When the half grown boys of the Wateree mill village persisted in throwing stones at strangers passing through, the Board of Aldermen considered two forms of discipline. One form, a kind of "direct action"—caning the boys—naturally suggested itself, because it had failed so often before. The other form, moral suasion, was so reasonable that it seemed to lack common sense; nevertheless, just for a change, the aldermen adopted it. They invited the culprits to an ice cream supper and then presented the issue to the boys, as from one citizen to another. The stone throwing ceased.

The idea then occurred to the aldermen, why wait until the boys get into trouble next time? Why not help them keep out of it? A fad for making sling shots took hold on the boys, and while no trouble had yet arisen, the aldermen feared it. Should they close their eyes till something happened, and then be surprised at what they had foreseen? Not being professional disciplinarians, and having no acquired taste for inflicting punishment they took no pleasure in waiting around for a disaster. So the aldermen decided to lead the sling shot fad into safe channels. They set aside a shooting range, persuaded the boys to take their sling shot practice there under regulations, and put up incentives for good marksmanship.

Many a good, husky lambaster will be out of a job if the Wateree method of reforming by gentle measures spreads widely. And yet, foolish as it may seem to take away from the good the reward of being able to make the wicked miserable, isn't the Wateree method economical?

I hear men of authority in our mills fearing innovations in management because they may interfere with discipline—particularly, anything which might seem to put a check upon discharging. As the Irish "copper" said: "It ain't because I hate ye that I bate ye, but because I have the author-i-ety!" Preserving discipline seems to some to mean throwing a scare into the evil doers by firing a man from time to time.

Discipline is a beautiful thing. It wins battles and horse races; it paves the way for education; it is the only key to Heaven. In a textile mill it is the force that assures a watchful eye and a deft hand, always ready to splice up a break in the yarn.

But where does discipline begin? Does it appear only when men are fired? I am afraid that that is too late!—too late for the man fired, at any rate. As the darky about to be hanged remarked to the sheriff, "All I has to say is, this is going to be an awful lesson for me." Too often the man hanged is the only person who gets the lesson. England never had so many robberies as when there was a death penalty for petty larceny.

Discipline, then, does not begin with the act of firing. Punishment marks the failure of discipline; every discharge brands the person in authority, more than the erring employee.

Does discipline begin when a man is threatened with discharge? I am inclined to believe that that is also too late. Even fault finding and warning about bad records are too late for real discipline. They avail nothing to make the careless wish to correct their faults and sometimes persuade them that more painful penalties are not to be expected.

Discipline starts far ahead of unpleasant issues. It takes its rise in the heart of the subordinate. He does good work and preserves decorum because he desires above everything else to do so. He likes his task, believes it fair, likes his associates, believes them square-dealers, is satisfied with his incentives, and thinks his rewards worth working for. Not fear, but enthusiasm, is the source of discipline.

The newer methods of management aim at securing discipline by creating enthusiasm. Sometimes they may seem to diminish the power of department managers to terrify their help, but if they will take a tip from the Wateree aldermen, they may find it worth while sometimes to forego the pleasure of inflicting punishment for the sake of having fewer to punish.

Men must be fired; yes; but there ought to be no quarrel over the privilege of admitting failure. Mill managers, like doctors should be judged successful, not by the number of men they bury, but of men they improve. When they admit this ideal they will have less quarrel with service work and other innovations designed to create a happier spirit and a sense of fair dealing. They will accept help of this kind from any quarter.

* Service Manager, Lockwood, Greene & Co., Managers, Boston, in Builders.

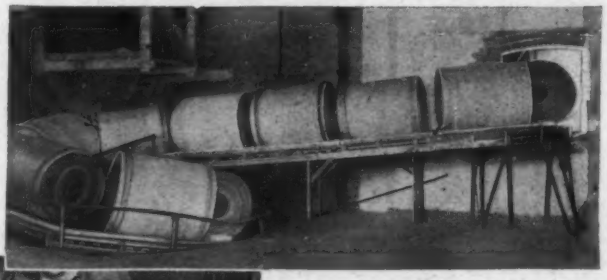
Training Future Executives.

The will to learn is being fittingly demonstrated by nearly 1500 employees of the Western Electric Company who are attending the educational courses being conducted at the many branches of the company throughout the country. What makes the figures particularly interesting is the fact that attendance at the schools is entirely voluntary.

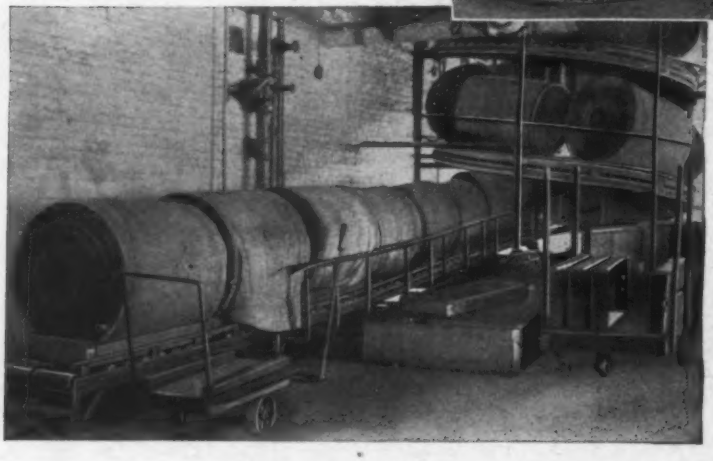
Records of the classes conducted at the company's big factory near Chicago show an enrollment of 962 employees. The courses in telephone practice and mechanical drawing have proved the most attractive. 225 are registered in the former, and 124 in the latter. The other departments in the order of their apparent attractiveness to the plant personnel are practical mathematics, sewing, comptometry, electricity and magnetism, typewriting, English, accounting, producion principles and manufacturing principles.

The opportunities for advancement offered in the night schools appeal alike to the factory operative, the engineer, the clerk and the salesman. 332 members of the engineering department of the company are using their spare moments as study periods. They are paying particular attention to the class in machine switching, a subject which has become of vital importance to technical men since the introduction of the automatic telephone into commercial use. Applications for this branch ran so high in numbers that it was necessary to split the class into two parts. The principles of direct and alternating currents, and shop mathematics are also big favorites with the embryo executives.

Classes in accounting and the general routine of business are being conducted at the office of the company at 151 Fifth Avenue, New York and at 195 Broadway. 110 representatives from the two Metropolitan offices are enrolled in five classes.



This is how the Arnold Print Works, North Adams, Mass., solved a difficult bale handling problem with a Mathews Gravity Roller Conveyer system.



Conveying by any form of trucks is at best only 50% efficient, because half the trucking payroll is spent for empty return trips. Mathews Conveyers give practically 100% efficiency, in addition to dispensing with the entire trucking force.

Greater Production and Lower Costs

Big business demands lower production costs and faster handling methods.

This permits the quoting of prices that bring sales volume and the giving of service that holds cutomers.

Hand trucks, push carts and industrial trucks for handling raw or finished products do not give the needed speed and economy. These methods always involve the unprofitable empty return trips for re-loading, which waste half the handling payroll.

Mathews Conveyors speed up production and cut down handling costs. No empty return trips—no trucking force to pay. Free gravity furnishes the power and does all the work.

Raw and finished products move in a steady stream from operation to operation, from floor to floor, or from building to building—around curves and through places too small for men to pass.

Compared with what they save their cost is trifling. Now is the ideal time to call in a Mathews Engineer and get his recommendations without obligating yourself in any way.

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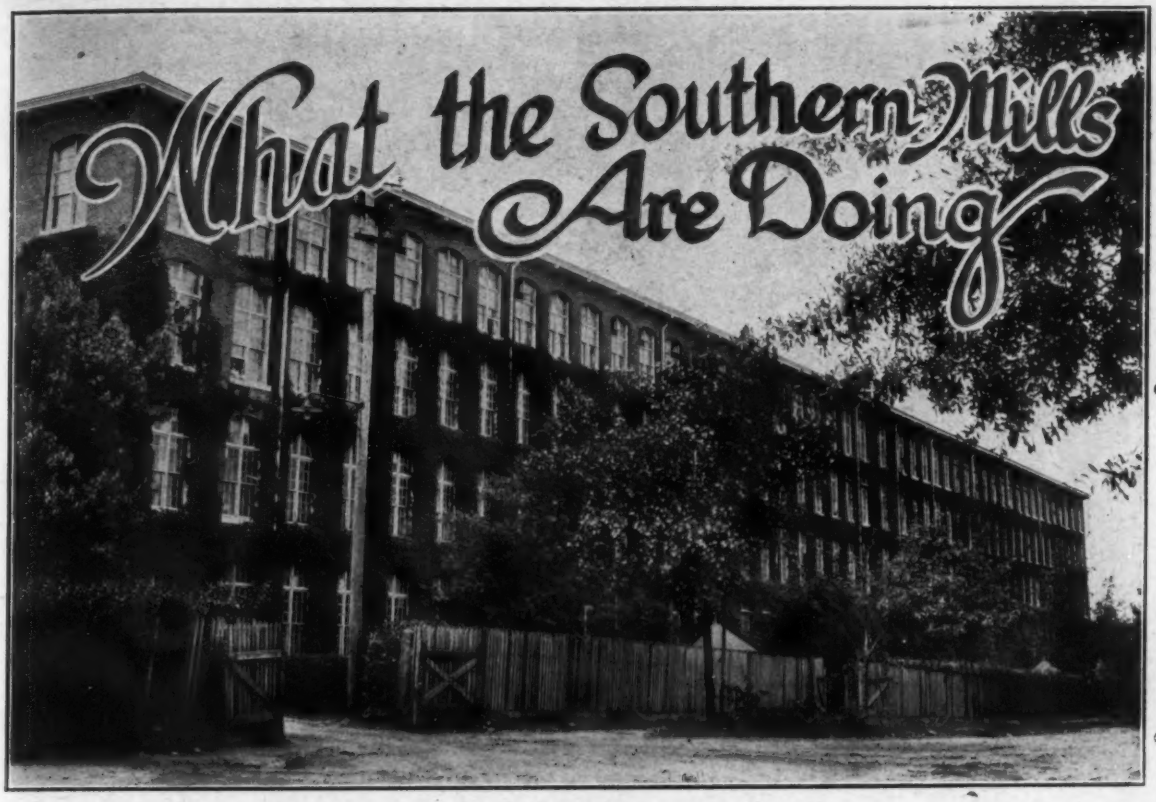

Orr Cotton Mills, Anderson, S. C.

The Carolina Cotton & Woolen Mills Co., Spray, N. C., recently completed a successful educational business training course in which more than 100 of its employees participated. This course was a sequence to an equally successful modern production methods course instituted for the foremen, managers and superintendents of this organization last spring, following which the management was petitioned by a number of employees who asked that they be given an opportunity for mental improvement to aid them in advancement in their work.

In response to these requests a business training course was organized in which the same text-books were used that had been adopted for the course for the foreman, and practical business problems were used and studied which applied directly to textile manufacturing. The executive committee of the course secured six men from within their own organization who were best fitted to speak in their respective lines of work, and who gave lectures to those taking the course on various important business subjects. Teamwork, organization, machinery and materials, production records and management were among the subjects discussed in these lectures, and the speakers used charts very effectively to present their points more forcibly.

As a result of this business course, 100 of the 130 employees who began the course were graduated, each with an average grade of 75 per cent or better on all problems, and a very attractive diploma was presented to each person finishing the course. The course as a whole was successful from every viewpoint, and the management of the mills feel that the work done will have a lasting and beneficial effect. It gave to a representative number of employees a broader view of business management and of their own local problems, which of course served to bring the management and the operatives closer together in a deeper relation of cooperation and teamwork.

Another interesting feature of the work being done at the Carolina Cotton & Woolen Mills is the Carolina Cooperative Council, whose purpose and plans have received previous mention in these columns. The third meeting of this council was held at Spray on Monday evening, January 24. At this meeting the annual production report review was rendered, which showed the millions of pairs of blankets made and the millions of yards of ginghams, etc., woven at the plants of this company in 1920, as well as the total pay roll of all the plants for the past twelve months. Considerable interest in this report was displayed by the 150 memebers present at the meeting.

The suggestion was made at this meeting that a committee be appointed by the council to investigate the cost of living, locally, as compared with prices prevailing among merchants in neighboring towns. After an animated discussion on the subject, the council unanimously voted to have a thorough investigation made. Among the other important things that came up for consideration was the authorization of a committee to work out a savings club plan for the employees of all the plants. This committee was instructed to report at the next council meeting with complete working plans of procedure.

The principal speaker of the occasion was Prof. Walter J. Matherly, of the School of Commerce of the University of North Carolina, who gave an interesting talk on industrial teamwork. Ralph Parlette and Dr. Lincoln McConnell, nationally known figures, have been secured for lectures later in the season.

A new Railing

Possessing none of the faults of the common iron fence, this new ANCHOR POST *Electrically Welded* RAILING will protect and dignify any property for years to come. Its pickets cannot work loose or fall; its top and bottom rails are not weakened with holes; there are no plugs, wedges, or rivets to rust through or give trouble. Rigid, erect, and straight as a die, it continues to be *effective*, yet pleasing.

— a Test

Five men, whose combined weight is approximately 850 pounds, caused a deflection of less than one-half inch in this ten-foot panel. When they stepped off the fence, it returned to normal again. Strength is built-in at the factory. Shipping and erecting these panels in no way impaired it. This test was made at the Willys Corporation's magnificent new plant at Elizabeth, N. J., where 2400 feet of this fence was erected.

—and a Reason

The pickets and rails are *grooved* square rods of open-hearth steel. Each picket is *welded* at top and bottom between the two rails. This permits of four distinct fusing points at each weld, or eight fusing points at every intersection.

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All the preliminary work can be started at once, and erection commenced in early spring. Write us—or one of our Branches.

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Boston, 79 Milk St.; Hartford, 902 Main St.; Greenville, S. C.; Philadelphia, Real Estate Trust Bldg.; Cleveland, Guardian Bldg.; Chicago, 8 So. Dearborn St.; Pittsburgh, Pa., Jenkins Arcade.

Anchor Post Fences

2820-G

The Fidelity Manufacturing Company, Charlotte, N. C., recently received authorization for an increase in its capital stock to $500,000.

The Merrimack Manufacturing Company, Huntsville, Ala., has completed a ninety-foot addition to the No. 1 mill.

The capital stock of the Conneross Yarn Mills, Anderson, S. C., has been increased from $100,000 to $200,000.

Lightning struck the 120-foot brick smokestack on the plant of the Griffin Manufacturing Co., Griffin, Ga., during a severe electrical storm that passed over that city on February 5. Only twelve feet of the smokestack was left standing. The bricks crashed through the roof of the main building of the mill, injuring a number of the employees.

The Chesterfield Manufacturing Co., Petersburg, Va., is reported to have under consideration plans for the erection of a new mill during the present year. Cotton hosiery yarns, as now manufactured in the present mill, will be the product of the additional plant, it is stated.

The Social Circle (Ga.) Cotton Mill is having 10,000 additional spindles installed, says a report.

The Liberty Cotton Mills, San Antonio, Texas, are reported to be considering the erection of a new mill at that place.

The Standard Tent and Awning Co., Atlanta, Ga., has been organized and incorporated with a capital of $20,000 for the manufacture of tents and awnings and kindred lines. D. T. Ricks, W. D. Morgan and F. D. Pierson, all of Atlanta, are the incorporators.

The Sanford Cotton Mills, Sanford, N. C., has recently improved and added to its equipment at an estimated expenditure of $225,000.

The Semple Manufacturing Co., Louisville, Ky., is spending several thousand dollars in the construction of fire escapes and safety equipment at their cotton mill.

The Pee Dee Manufacturing Company and the Entwistle Manufacturing Company, Rockingham, N. C., are contemplating the installation of sewer systems in their mill village.

The Brandon Mills and the Judson Mills, Greenville, S. C., have completed and now have in operation a steam and electric laundry at their respective mills, which will be run without profit under the supervision of the mills, as a service to the operatives.

The Pacolet (S. C.) Manufacturing Company is planning the erection of a school house, to be three stories high, of brick construction with tile roof and hardwood floors, at an estimated cost of $150,000.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, February 11th, 1921.

The advancing tendency of the market, noted after the turn of the new year, was checked by a falling off in the demand for goods and the continuance of unfavorable trade accounts from Manchester, and because of the failure of the spot demand in the South to revive.

The depreciation in the value of sliver, politics and the financial depression in Turkey, India and China is responsible for the bad state of trade in England.

There was much disappointment in the South owing to failure of the demand for raw cotton to improve following the resumption of industry in the textile districts in the United States. As yet American spinners are buying from hand to mouth only, taking of the staple only as their immediate needs require, and such purchases have been confined mainly to the low grades. The better demand for the poorer qualities, however, has been helpful, much of their recent big discount having disappeared, and it is predicted that differences will continue to narrow in the future. Nevertheless, the market feels the want of a better general demand for the large surplus held in the interior, holdings figuring about 3,000,000 bales more than was on hand at this time one year ago.

Pending the expected improvement to come from abroad, now long over-due, the resumption by American mills is noted in consumption increasing in the United States. Compared with last season, returns to the Census Bureau show that 366,000 bales of lint cotton were consumed by American mills during January vs. 295,000 in December and 592,000 in January of last year.

While returns are much smaller than for January of one year ago, they show a marked improvement as compared with December of this season, with every prospect of continuing to increase in the future, as reports are being received daily of more mills resuming work.

Since September 1st. consumption of lint cotton in the United States figures 2,334,000 bales against 3,139,000 last season, of linters 196,000 vs. 149,000, making a total for the first six months of the season of 2,530,000 bales compared with 3,288,000.

A noteworthy feature of today's Census Bureau report was the big increase in active spindles in the United States during the month of January—1,631,000 more than in December—31,509,000 against 29,878,000, comparing with 34,740,000 at the close of January last year. Of the idle spindles only 276,108 were allotted to the cotton growing states.

Meanwhile more textile mills have resumed operations in America since the close of last month, and it is likely that returns for February will show a further increase in the consumption of raw cotton and of active spindles in operation.

Dullness, stagnation we might say, of trade in England has been the great drawback to the market, as other foreign countries continue to take almost their full quota of exports, except Japan, while Germany is now running far ahead of last year, exports to that country for first half the season totaling 582,000 bales vs. 174,000 for the corresponding time one year ago.

While stocks in public storage in the United States were large at the end of January—5,645,000 vs. 3,758,000, mill stocks in America were small, northern mills holding 649,000 against 846,000 last year, while southern mills held only 624,000 bales vs. 1,106,000 one year ago.

As to the preparations for the next crop, farm work is generally backward, especially to the east of the Mississippi River where little or no land has been broken as yet.

Information from the interior is to effect that there is going to be a big reduction in the cotton acreage this year, as farmers find that it will be unprofitable under existing conditions to make anything except a small crop, which will be the only means, with the present depressed condition of trade, of removing the present large surplus eventually and forcing prices to a higher level ultimately.

Notes About Men You Know.

L. W. BECKNELL, overseer of spinning, twisting and winding at the Elizabeth City (N. C.) Cotton Mill, also chauffeurs his car in his spare moments.

LINDSAY PADGETT, the well-known district manager of the Swan & Finch Company, with headquarters in Charlotte, N. C., is very optimistic of the general business outlook in his territory. The increase in sales of "Slo-Flo" has been very substantial, he states, and has been materially helped by the added distributing facilities provided by the warehouses of which there are now three, located in Charlotte, Greenville and Atlanta.

H. K. ROBERTS, formerly superintendent of the Long Shoals (N. C.) Cotton Mills, has been made superintendent of the Vance Cotton Mills, Salisbury, N. C.

T. R. MORTON has accepted the position of overseer of carding at the Cabarrus Cotton Mill, Kannapolis, N. C.

J. C. BALLARD, superintendent of the Cherryville Manufacturing Company and the Howell Manufacturing Co., Cherryville, N. C., will also be superintendent of the Rhyne-Houser Manufacturing Co., of the same place.

W. L. CAMPBELL has been appointed superintendent of the new Rowan Cotton Mills, Salisbury, N. C.

W. R. NEIGHBORS has been promoted to superintendent of the Tifton (Ga.) Cotton Mills.

CHARLES ELDER has resigned as overseer of spinning at the Maginnis Mills, New Orleans, La.

A. L. WHETSTONE has been appointed spinning overseer at the Magnolia (Miss.) Cotton Mills.

W. H. HAINES has been made overseer of carding at Georgia Cotton Mill No. 2, Griffin, Ga.

G. W. PATTERSON has resigned as overseer of finishing at the Swift Manufacturing Co., Columbus, Ga., and accepted a similar position with the Eagle & Phenix Mills, Columbus, Ga.

D. W. MCLEMORE has succeeded J. R. Haney as superintendent of the Hartsell Mills, Concord, N. C.

CHARLES B. ILER, salesman for the Baltimore Belting Company, died recently at his home in Greenville, S. C. Mr. Iler had been a resident of Greenville for 29 years. His death followed an extended illness.

JOHN D. COOPER died at his home in Henderson, N. C., on January 18. Mr. Cooper was born on March 15, 1849, his death occurring in his 72nd year. He was educated at Horner Military Academy, and for many years had been conspicuous in the business life of Henderson. He was president of the Farmers & Merchants Bank, president of the Carolina Bagging Mills and the Farmers Loan Supply Company, and was a director and one of the largest stockholders in the Henderson and Harriett Cotton Mills. He was a brother of David Y. Cooper, the late president of these mills, whose death occurred on December 20.

L. C. LANGSTON, superintendent of the Rainbow Mfg. Co., Ozark, Ala., was recently made superintendent of the Ozark Cotton Mill Company, in addition to his former position. Both plants are under his supervision.

SIDNEY P. COOPER has been elected president of the Henderson and Harriett Cotton Mills, Henderson, S. C., to succeed his father, the late D. Y. Cooper.

WILLIAM H. BENT, vice-president of the Mason Machine Works Co., Taunton, Mass., died on Thursday, January 13.

EDWARD C. TURNER has accepted the position of assistant superintendent of the textile division of the Mason Tire & Rubber Co., Kent, Ohio. He formerly held a similiposition at the Towar Textile Corporation, Toledo, Ohio. He was at one time overseer of weaving at the Fulton Bag & Cotton Mills, Atlanta, Ga.

D. K. DUNN has resigned as overseer of carding at the Adams Mill, Macon, Ga., and accepted a similar position at the Manchester Cotton Mill, Macon, Ga.

J. Z. BROOKS, formerly overseer of the cloth room at the Thomaston (Ga.) Cotton Mills, is now in charge of the cloth room at the Willingham Cotton Mills, Macon, Ga.

W. J. HUNTER, formerly connected with the Woodside Cotton Mills Co., Greenville, S. C., has accepted a position with the Consolidated Textile Corporation, and will have charge of their cost accounting work at the Greensboro (N. C.) office.

A. DEWEY CARTER, son of A. B. Carter, of Greenville, S. C., has moved to Charlotte, N. C., where he will be in charge of the office of the Paint Department of the Southern Cotton Oil Company at that point.

C. J. HUNT, well known to the southern textile trade, is now making a trip through the southern section in the interest of his company, Wadsworth, Howland & Co., Inc., 139-151 Federal St., Boston, specializing on their Bay State brick and cement coating, Bay State cement floor coating, Bay State roofing stain, Dixielite mill white which is made in flat, semi-gloss, and other Bay State products. Mr. Hunt will place particular stress upon Bay State roofing stain.

MARION R. CASEY, recently connected with the Ware Shoals (S. C.) Mfg. Co., in the weaving department, is now representing the Economy Textile Supply Co., of Asheville, N. C.

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STRAIGHT LINE METHODS

How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

A Picker Problem.

EDITOR COTTON:

In investigating the application of anti-friction bearings to the evener equipment and apron of intermediate and finisher pickers, a question arose which we believe will be of general interest to textile men. The idea of applying the anti-friction bearing to the evener rolls and apron was to make the evener equipment more sensitive to changes in the weight of the lap. We discovered, however, that on account of the fact that the feed rolls were driven at varying speeds, depending on the position of the belt on the evener, the purpose of the evener equipment was defeated when short changes in the lap were registered; that is, when a variation in the lap covered only a few inches longitudinally.

We will try to explain this situation as follows: Suppose the picker is doubling four times (as is usually the case) the draft or ratio between the surface speed of the screens and the feed roll will be four to one approximately. Therefore, three inches of lap going through the feed rolls will represent *twelve* inches of lap on the screens.

Since the evener roll is about three inches behind the feel rolls, when a small change in the weight of the lap is registered on the evener rolls, if this change be a thin place, the evener equipment will speed up the feed rolls as well as the apron and evener rolls. The result is that the stock in the feed rolls at the time the thin place hits the evener rolls is fed through to the beater at an increased speed; but since the stock between the evener and beater blade was normal in every way, the beater will receive an excess amount of stock until this thin place hits the beater blades. Since this distance of three inches represents twelve inches on the screens, there will be a heavy place, twelve inches long, in the lap. If the thin spot is of short duration, the lap in the evener may be normal as to weight by the time the thin spot hits the beater blades. The whole system is then slowed down, resulting in a thin place in the finished lap.

In the same way, if the speed of the evener roll should be changed by a heavy place hitting the evener roll, the feed roll will feed too light to the beater with the result that there will be a thin place in the finished lap equal to the draft, multiplied by the distance between the evener roll and where the cotton actually comes in contact with the beater blade.

We appreciate, of course, that the fan itself has a great deal to do with distributing the fiber on the screen. It is not only necessary to have the draft properly regulated, but good bearings to insure uniform fan speed, or uniform draft, are absolutely essential. The bulk of the fibers will be laid on the screen where the air is moving fastest, which of course is at the entering edge or the very top of the top screen and the bottom of the lower screen.

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

On account of this fact, the fibers will be laid uniformly across the width of the screen and in this particular direction there will be no thick and thin places. The lap will, however, be thick and thin in the *other* direction in the same proportion as the cotton is fed heavy or light through the feed rolls.

It would seem to us, therefore, that the feed rolls should be driven at a constant speed, independent of the evener equipment. In this case the evener would feed a uniform weight of fiber to the feed rolls and the feed rolls in turn would feed uniformly to the beater, which is the ideal condition.

We would like to see your contributors comments on this point. W. H. H. (Ga.)

Again Consider the Opener.

EDITOR COTTON:

Taking up the thread of the preceding articles, we will now follow the bulk of cotton from the spiked apron over the arc at the top and there we have what is called the fan. This fan usually has four strips of leather fastened to its surface, protruding about 1½ inches and braced in such a manner that its high velocity creates a blast draft that removes all particles of cotton from the pin points. These particles usually wend their way down a short incline and are carried from there through dust trunks, large pipes, etc. There are various kinds of dust trunks that are so constructed inwardly that a tremendous amount of foreign matter is removed. These trunks will never reach their maximum capacity until the opening machinery is made to open the huge pieces of pressed cotton that are found in the opener hoppers. The reader will readily see that my theme of clean even yarn secures its base in the first machine which may be classed in the picker class.

With the tiny tufts of cotton removed from the mass where a gravity back described in February COTTON has been used, the opening process as far as this type of hopper is concerned makes an ideal condition to present to a trunk and blower system. The blower in itself is ideal. As the blast strikes these small tufts they are easily

broken into smaller particles and as these small particles go bounding over the obstacles that are placed inside a trunk conveyor, the sand, leaf and dirt of all nature separates from the fiber more readily than it would if carefully wrapped within the larger pieces which the tumbling process, described in the December number, allows to pass by the evener roll in the two-apron hopper. Where a blower system is used exclusive of the trunk, the force with which the small tufts are hurled against the condenser screen in the picker room proper removes a great quantity of foreign matter and it will be found that a perfect even sheet of cotton is massed upon this condenser and is thoroughly opened and dusted.

After this process is passed, the cotton is conveyed to bins or to the hoppers of breaker pickers, usually of the same construction as the opener previously explained. It matters not whether there are automatic conveyors over the openings of the hoppers or whether the cotton is fed by hand as far as the construction of this breaker hopper is concerned, although a hopper mechanically fed will carry an evener pressure load than one fed by hand, the writer thoroughly understands, but unless the breaker hoppers carry a gravity back similar to the one described in the February letter of this series, it matters not as to the results obtained. If the opener requires the construction mentioned in order to maintain accuracy throughout the process, there should be a hopper on the breaker pickers constructed exactly as was the one on the opener, giving the opening process free rein as long as it lasts.

This granted to be correct, we find ourselves following the tiny particles from the pins of the upright apron in the hopper of the breaker pickers down the incline over a smooth plate or a small screen, allowing all possible chance to secure all droppings possible from the already separated fibers that originally started in a massed form. This cotton now is distributed to the apron leading up to the first pair of feed rolls in a soft downy form and is presented to this set of feed rolls in a condition free from bunches or lumps.

This description of the proper method of cotton opening will be read by many who, no doubt, will pass upon it lightly, and perhaps won't grasp the fact that this method has proven to the writer the only means of eliminating the foundation of all troubles of sizing unevenness, weak and flaky yarn. To those who would like to get to the seat of things, I would advise the trying of a few experiments, when possible, along these lines.

When one attempts to produce a sliver from a drawing frame, the things uppermost in the mind is a smooth, even fiber, but never have I conversed with anyone who, when through with a new adjustment on their pickers, said, "I am satisfied that every inch of the yardage in my laps is perfect." But this is a proven fact: I have stood for hours and watched the evener belts on the cones of pickers where the cotton has been opened by the method given, and the position of the cone belt did not change for half hour periods at a time, and then but slightly.

As the cotton is delivered to the first set of feed rolls after leaving the hopper of the breaker picker, we now find it in a form that requires a slight condensing. This can be accomplished by placing a wooden roll, gear driven, just behind and above the feed rolls. Where the regular opening system is used, these feed rolls can be seen to allow the cotton to be drawn in by the beater (without being beaten). This jumping, as I term the process, is caused by the bunches that the hopper has allowed to be delivered and they cause the feed roll to be lifted as high as the bunch demands in order that it may pass and the thin place directly beside it (which is also caused by the poor opening process commonly used) has nothing to hold it in the grip that is required in order that every inch may be beaten by the beater and it is whipped into the beater box and thrown upon the cages by the force of the revolutions of the beater, unbeaten, unopened and bulky.

If the doubting reader will look at the feed roll on the breaker picker carefully, especially on the extreme ends, he will see just what I have described. Then he should ask himself the question, "Where do these 'jumpings' terminate?"

I claim that if a man is going to run a beater in the pickers he should make it do its work properly.

Again, if the proper opening hopper is applied to the pickers, the feed rolls have no bunches to handle, no thin places to allow the beater to whip through, and it will be found that the vibration of the presser feed roll has ceased its antics. Every fiber is held in position until it is properly beaten and then is allowed to pass on to the cage in fiber form and when distributed in this manner the sheet upon the cages is nearly perfect.

Of course, there are many kinds of beaters and I think in passing, I shall endeavor to show that the Kirschner beater is the ideal method for extracting the leaf, sand and motes which, if allowed to remain in the cotton, have a tendency to weaken the yarn, for rolls cannot draw when lifted from the driving roll beneath and in this respect are similar to the half lap on a comber.

A. B. C. (R. I.)

Desires Operation Costs.

EDITOR COTTON:

We shall be glad if you will have the following questions published in an early issue of COTTON:

What is considered a good cost on 26-1s, 28-1s and 30-1s carded hosiery yarns in the following departments:

Opening and picker room cost, per pound.
Card cost, per pound.
Slubber, intermediate and
Fine frame cost, per pound. (Separately, if possible; if not, then as a whole.)
Spinning cost, per pound.
Winding and packing cost, per pound.
Also machine shop cost, per pound.

If there is any difference in these costs between a steam driven and an electrically driven mill, please show the difference. Overhead should be eliminated.

XYZ (N. C.)

EDITOR COTTON:

In answer to the request of "X. Y. Z. (N. C.)" we give below a scale of labor cost for various departments of the mill, based on 26-1s, 28-1s and 30-1s carded yarn. While we are not running on these numbers at the present time we would consider the figures given herewith as representing a very good cost on these numbers at the pres-

New Export Problems

Mere order-taking in foreign trade has had its day. Though American shipments of foods, merchandise and materials over-seas continue large, exporters in every line recognize that the turn in the tide has come.

In future, goods that go abroad must first be sold. Customers must be sought, studied, served. Markets must be developed and connections formed on a basis of information and analysis even more exact than those required in securing business in the past.

In making contacts with unfamiliar markets—in keeping touch with changing conditions—in carrying out the financial or shipping operations required in over-seas transactions—the Irving's Foreign Service and Foreign Trade Divisions may be able to supply you with just the information, counsel or banking and commercial aid you need. For exporters—as well as importers—Irving service spans all seas.

IRVING NATIONAL BANK

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ent time after discounting recent wage reductions. This is labor cost only but includes superintendent's salary, proportionately distributed. As per his suggestion we did not include any overhead expense.

	26-1s per lb.	28-1s per lb.	30-1s per lb.
Opening and Picker Room	.00285	.00315	.00245
Carding and Drawing	.00295	.00326	.00358
Slubbers	.00194	.00205	.00211
Intermediates	.00351	.00388	.00416
Speeders	.00446	.00493	.00535
Spinning	.01493	.01648	.01835
Warping and Packing	.00891	.00984	.01078
Machine Shop	.00565	.00621	.00678
Total Cost per Pound	.04520	.04980	.05655

I trust that this information will meet the requirements of your correspondent and be of some service.

Contributor No. 30.

The Reischmann Company recently announced its removal from 14 East 32nd St., New York City, to the new thirteen-story Aronson building, 229-239 West 36th St., New York City. This company, which was established in 1863, are manufacturers of tables, chairs, stools and special furniture equipment for lunch rooms, cafeterias, offices, reading rooms and rest rooms—products with 57 years of experience behind them. Since its beginning, the business of this organization has been very successful and their former quarters long ago ceased to be adequate for requirements. For more than a year the Reischmann Company has been on the look-out in uptown Manhattan for a suitable location and a building that would afford the company sufficient space for expansion, and accordingly secured a lease on the store floor and basement of the new Aronson building.

This new location has a frontage of 115 feet and a depth of 113 feet, the street front is practically all plate glass and there are windows for light in the side and rear walls—an unusual feature in business structures. The mezzanine is 115 by 56 feet and has approximately the same area as the store floor at the company's former location. The basement of the building will be utilized by the Reischmann Company as a showroom for hotel and restaurant furniture.

Edward R. Ladew Company, Inc., with factories at Glen Cove, N. Y., and general sales offices at 428 Broadway, New York City, have just issued two booklets of interest to users of leather belting. One of these, entitled "The Proof Book," is a compilation of evidence of the dependability of Hoyt leather belting in service, with a brief discussion of some of the fundamentals of belting economy. The illustrations are from actual installations, showing belts of this type which have been in service over various periods up to 44 years. A variety of difficult drives are also pictured.

"Ladew Leather Belting" is the title of the other booklet. This is an 80-page catalog describing the manufacture of Hoyt leather belting from the rough hide to the finished product. The Ladew organization have been tanners and manufacturers of this belting and other leather products since 1835. Belting rules and tables are also given in this publication, with a data sheet for analysis of belt drives for highest economy. Belting accessories are also included.

THE NEWPORT COLORS

Vat Dyes

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Newport Anthrene Blue R S Paste
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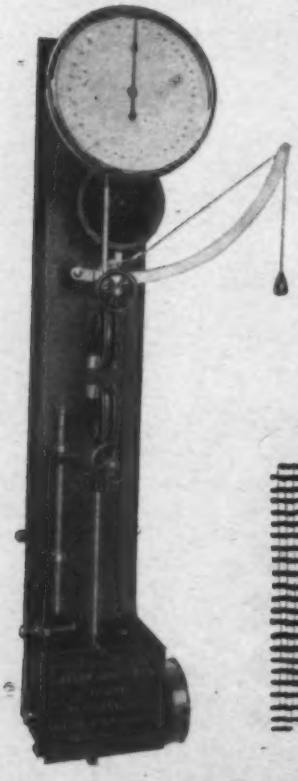

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Making 12s and 20s Yarn.

EDITOR COTTON:

Replying to the remarks of "Benjamin (Conn.)" in the January number, in reference to roll settings, I wish to state that my original quotation was as follows: "The setting of the steel rolls on this weight of sliver should exceed in the distance from center to center of the rolls ⅛ to 3/16 inch longer than the staple although it is sometimes customary to have the third and fourth rolls set a little wider than that." Which, in substance, means this: Supposing you have the first rolls set up as close as the stands will allow, then on the back rolls, you set them from ⅛ to 3/16 inch or wider as you see fit. Personally I prefer the two back rolls set, from center to center, 1½ inches. That is on a 55 or 60 grain sliver on drawing.

When the article which appeared in the September number was prepared, the writer did not go into the figuring out all the minute details at the different machines to see that everything figured out to the fractional part of a point. Some was left for the readers to calculate and to work in connection with the prevailing circumstances at the different plants. Weights and drafts were generally given as approximates, but for "Benjamin's" benefit I will show how I made the 12s and 20s yarns, not how I figure them to be or how they can be made, and more than that, I guarantee the breaking strength of the yarn, which is "nuf sed."

First we will take the 12s yarn. At the outset of my article in the September number I said the card sliver should be about 50 grains per yard, not to exceed 55 grains. Taking the 55 grain sliver for the first drawing frame with a draft of 6 and a doubling of 6, this gives a sliver weighing 55 grains. This on the second drawing frame with a doubling of 6 and a draft of 5.78 gives a sliver weighing 57 grains. On the slubbers, with a draft of 4.10, this gives a slubber roving weighing 166.8 grains per yard. On the speeder frames, with a doubling of 2 and a draft of 5.75, it gives a roving weighing 58 grains per 12 yards. Now on the spinning with single roving in the creels and a draft of 7.00, it gives 8.285 grains or 12.07s yarn. That's simple enough, isn't it?

I will now take the 20s yarn spoke of, and will give my organization as I made it. This will be on the 50 grain sliver. 50 grain card sliver, 1st drawing frame with 6 doubling and 6.25 draft makes 48 grain sliver per yd.; 2nd drawing frame with 6 doubling and 6.25 draft makes a 46 grain sliver per yd; 46 drawing sliver for the slubbers with 4.10 draft gives a roving of 118.68 grains per 12 yds.; 118.68 grains for the speeders with a draft of 6.50 and doubling of 2 gives a speeder roving of 36.5 per 12 yds.; 36.5 grain roving for the spinning and draft of 7.00 on single roving gives 5.00 grains or 20s yarn.

I hope this will be understood by "Benjamin." If it was guess work, or a mere calculation, or a supposition on the part of the writer, it would be different, but it is practical, and just what is being done.

As to the ¾ to 1 inch staple, or ⅞ to 1 inch staple, that is but a small trifle to argue on. As will be seen, twice, further on in the article, the staple was spoken of as ⅞ to 1 inch staple, and that is what was really meant, but the difference in the staple of ⅛ inch, in running 12s yarn, doesn't matter, and the mill man hasn't the time to test out the ⅛ths of an inch, especially where carding 210,000 pounds a week, on a 55 hour week working basis.

In this article, as well as in the original one, space and time is too limited to go into the full calculations and granting that the reader is able to do this, I omit such details.

In conclusion, I wish to thank "Benjamin" for his most courteous comments, which I am sure have not only aroused interest in the subject, but have also brought out in clearer detail many things that might otherwise be obscure. I also wish to ask him what are the right weights the top drawing frame rolls should have on slivers weighing 46 grains per yard? Also, what diameter of hole should the trumpets be bored to for a 46 grain sliver, using metallic rolls? Contributor No. 14.

About the Fine Speeder Twist Problem.

EDITOR COTTON:

We have read with interest the remarks of "Wash (Conn.)" in the February number of COTTON, and shall herein take up his letter by sections and try to explain matters more fully. "Wash" states that he thinks we would get better results if we mixed 50 bales at a time instead of five. We do not think that he understands what we mean. We lay down on the floor around our bale opener five bales of cotton of five different marks, taking a layer from each bale and placing it on the apron of the bale opener. We don't see how we could open 50 bales of cotton at one time, as we have not floor space around our opener to lay down 50 bales and the distance that the bales would be from the machine would require considerable carrying on the part of the operatives. Perhaps "Wash" means that we should mix 50 bales at a time before running through our breaker pickers. This is practically what we do, as we have several opening bins which hold from 25 to 30 bales each, and which we fill up from the bale opener and then use the cotton from the oldest opening, which gives us an ageing of several days in each bin, before we have to use the cotton. In other words, we have five bins which hold from 25 to 30 bales each, and as we use about 100 bales of cotton a week, you can see that we get a fair ageing before using the cotton in the last bin.

"Wash" says our sheet of lap is too heavy. It seems to us that there is a good chance for an argument on this point. We have run an 11-ounce lap on our finisher pickers in times gone by, but we consider that a 14-ounce lap gives us a sheet with fewer inequalities than an 11-ounce lap does. In the lighter sheet even under the best attention there are more thin places, or in some cases actually holes, in the sheet than in the heavier lap. We find from inquiry that the tendency in the last 10 years has been to get away from the light lap theory and that a great many of our newer and finer mills are running a 13 or 14-ounce finisher lap. It is also considered that with a heavier lap and the correspondingly longer draft on the cards that better results are obtained from the action of the licker-in on the sheet of cotton as it is presented to it by the feed roll. Our Kirschner beaters are run at some 840 revolutions per minute.

In regard to the breaker drawing, we agree with

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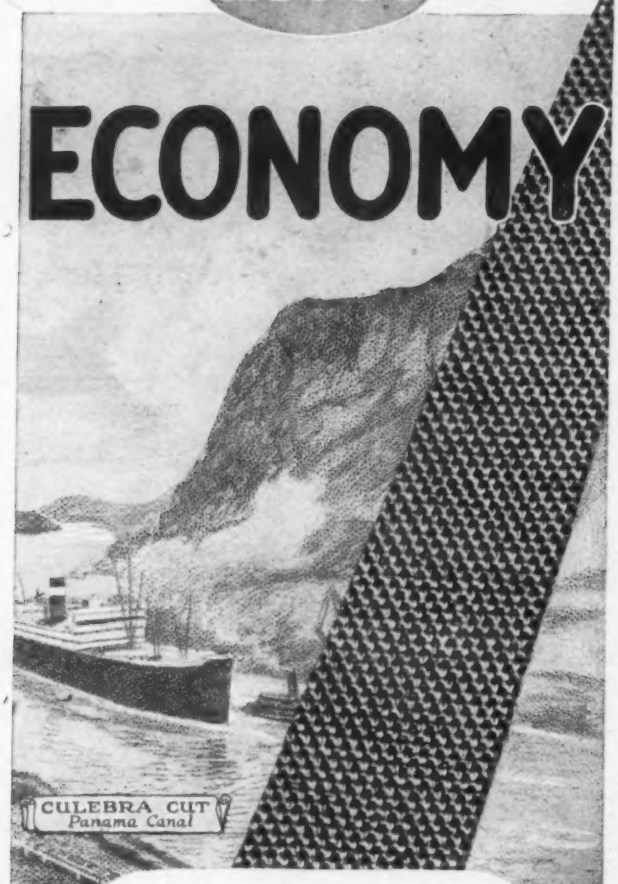

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"Wash" that we would possibly get somewhat better results with a draft of 6, but in our case we are running faster now on our breaker drawings than we like to, as we have no room or floor space to put in any more deliveries of drawing. Also, in regard to the slubber hank, it would be impossible for us to get our production if we should change to a .75 hank roving and we have no chance to increase our slubber spindles.

Our fine speeders are running at the maximum speed recommended by the builders and we see no reason why we should endeavor to increase the speed of the spindles when we are getting first class results from the speed we are now running, and with very little breakage on the frames.

What has puzzled and still puzzles us is how "Wash" is able to run with as little twist per inch in his 6.00 hank roving, with the stock he was running, namely, 1 1/16 inch cotton. We have our records from other mills in which we have worked in the past 25 years and from other mills with which we are acquainted, and in looking them over we fail to find one instance in which it was possible to make a 6.00 hank roving with as little twist on ordinary 1 1/16-inch cotton. We have no doubt that we could take out a tooth of twist and get away with it, although we have always tried to obviate any chance from complaint from the spinning room about too little twist, roving breaking back, etc.

The other points mentioned by "Wash," such as setting of rolls, relation to the surface speed of the front roll and bobbin, the care of the slide, and absence of draft between the front and calender rolls on the drawing frames, are all quite important and are something that we are working on all the time. Contributor No. 19.

EDITOR COTTON:.

In reading the latest communication of Contributor No. 19, I note with regret that he is helpless as regards making the necessary improvements due to lack of floor space.

I am not going to argue at length on my position regarding the weight of the sheet of lap. I have been a carder and superintendent for the last 30 years, and have never run a lap heavier than 11 ounces to the yard. For years I was superintendent of a mill in New York State, a mill that had a high reputation for making skein and twisted yarns. I have run laps as light as 9 ounces to the yard. If a picker will make holes in the sheet of lap when weighing 11 ounces to the yard, what will happen when running an 8-ounce lap? I know mills that are running 8-ounce laps. See any machine catalog. There must be something wrong with his finisher picker. I am not given to boasting, but I will guarantee that I can make an even sheet of lap weighing 11 ounces to the yard on any picker.

Would he argue that more foreign matter can be extracted from a heavy sheet of lap? Can he set his licker-in as close to the feed plate with a sheet of lap weighing 14 ounces as with an 11-ounce lap? Will he argue that setting the licker-in almost to touch the feed plate is not a good point in carding? Does it not stop "flaking"? Does it not protect the cylinder wire from material of a hard nature that may find its way to the cylinder when a space of 12/1000 gauge or more exists between the feed plate and licker-in?

He states that the finer mills are running 13 and 14-ounce laps. Not in New Bedford, Mass., and there is where you will find a large number of fine mills.

Any stock 1 1/16 inch in length that will break 67 to 70 pounds is wiry stock. Therefore, it will condense much more than a weaker and more fluffy stock. He is running 1300 r. p. m. on his fine frame spindles. This speed will cause more pressure at the termination of the presser finger on all flyers. Therefore, with a coherent strand to begin with, and with a speed to condense the bobbin as well as the strand, the fine frame should run slack if the proper rack gear is used. If not, the top front leather rolls have too much to do, due to an excessive draft, especially on the slubbers, which causes stretch during the building of the set. That is why I wanted him to make the test outlined in my last letter, by lifting a bobbin gear and turning it back so as to cause slack, then start the frame again, and if this slack is taken up immediately, it is proof that stretch takes place on all other ends, and it also proves that the frictional contact between the front steel and leather rolls is great, which cause the leather roll to lag behind the speed of the steel roll and causes stretch. I think he will find this is what puzzles him.

He would make a great mistake by increasing the speed of the fine frames. However, I beg to differ with him when he states that he is getting first class results. His front roll speed is only 99 r. p. m., while the lowest speed I ever ran was 106 r. p. m., and the yarn broke as low as 54 pounds. Wash (Conn.)

How the Employment Manager Helps the Overseer.

EDITOR COTTON:

The value of service work in the cotton mills of today has not been questioned except in this one phase—the relation between the employment manager, the overseer and the man to be hired or discharged.

To discuss this let's take a mill where a service superintendent or employment manager has been employed and where he or she must set up an employment department, and then follow the process right through. Of course it is absolutely necessary for the service superintendent to first win the confidence of the overseers so that they may work together. When the employment manager is ready to perform his duties the overseer no doubt has his full equipment of help, yet he has one or two that are not quite up to the standard which means that a change must be made, or that there must be a speeding up of these individuals.

Now, first of all, the reader must get all ideas like this out of his mind—that is, that an overseer walks around his room, stops at a certain machine and says to himself, "Well, the help is coming in much better now; I guess I'll get rid of this fellow tonight." And so discharges him. No, a really good overseer has the discharge of a certain man in his mind long before the actual discharge takes place. In fact I think a man goes through about three stages in being discharged. The first is warning. I think when most overseers see a man slipping they first give hints that the man might speed up which sometimes helps. The overseer talks over the fellow with the second hand and if he does not speed up to the standard expected of him he is threatened, that is he is told to speed up in

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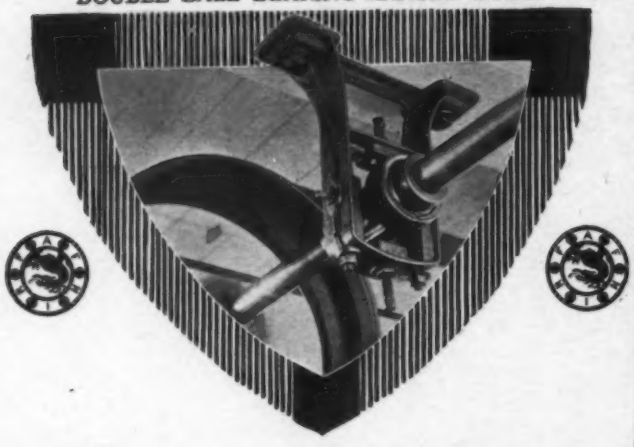

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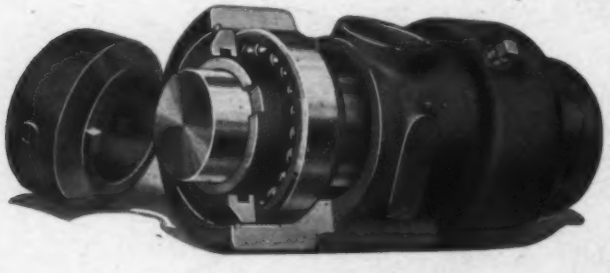

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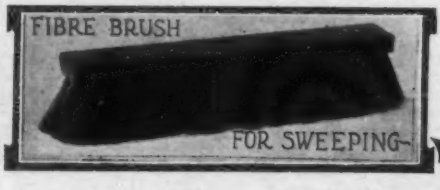

order to hold his position. Then, if he does not respond, comes the actual discharge. All this takes a period of several days or even weeks, depending on the overseer and how quick he wants results. I think all overseers will agree with me that this is the way an efficient man is generally discharged.

Now, what is the relation of the employment manager to this discharge? The procedure should be as follows: When the overseer sees that a man is beginning to slip he should immediately take the matter up with the employment manager. The employment manager has careful and accurate records of all the employees in the mill and he proceeds to look up the man in question. The employment manager has made a study of psychology and service management and can reach conclusions much quicker than the ordinary overseer. Perhaps he may find, after a thorough investigation, that the man in question is having home trouble, perhaps physical troubles, perhaps bad habits and perhaps is not fitted for the position. But whatever the cause, the overseer and employment manager try to remove it first and help the man in whatever way he may need assistance—many a man can be saved for the company in this way.

If the trouble is with the man and he cannot be speeded up he should be transferred if possible; if not he will have to be let go. If the trouble is with something the man will not try to correct, such as bad habits, then without question the man should be discharged.

The question arises, "Would this course affect the overseer's standing with the help? If the man was saved for the company would the rest of the help think that the overseer discharged him and the employment manager reinstated him over the overseer's head?" How could they, as they wouldn't know anything about it? Then, supposing the man was discharged, would the help think the employment manager had come in and said, "I guess we'll get rid of this man today," and so discharged him? How could they think that, when all they see is the overseer tell the man he must go? Think this over.

Now let us consider the man that is summarily discharged. You cannot say when a machine breaks down the first time to do this, and the second time to do that, for the simple reason that you never know just what is going to break first or second. It is all right to lay down certain rules for discharging a man for certain reasons, but I don't think the rules always apply. I believe here is where the overseer needs to use his own discretion.

For instance, I recently heard an address by one of our distinguished employment managers in which he made the statement that two men caught fighting should be instantly discharged. I disagree with him as I can picture a fight where I would discharge both, one, or perhaps neither of the participants, according to what I found out about the fight. My idea would be for the overseer to investigate the fight and then use his own judgment. But when the time comes for an overseer to discharge a man, then that discharge should be final. However, I do not mean by this that the overseer should not be questioned about that discharge. He should make his report to the employment manager and they should talk the matter over. Perhaps the overseer's temper was the cause; then in talking things over the overseer should be counciled in controlling his temper so that the same thing should not occur again. In fact the employment manager can give the overseer a great deal of help on account of his training.

Some overseers lay unusual stress upon their ability to get help, and yet, if you will consider it, it is not the ability to get help, but the ability to hold help that counts. If the employment manager helps, the good overseer will require very little assistance, while the poorer overseer will require a good deal, and this assistance will benefit the overseer and the mill, making the overseer a much more valuable man.

Next, let's suppose that we have discharged an employee and have a vacancy that must be filled. Where does the employment manager help out here? First of all, the employment manager's office is always open and all persons looking for work are sent to this office and not in the mill. Here they are questioned in regard to their ability and experience in a systematic way and they leave their address so that they may be sent for when needed. When the overseer needs a man he may have a man in mind who, he feels, will just fill the vacant position. He consults with the employment manager and finds that this man is not registered. They then get in touch with this man and if he desires to take the job he is registered and sent in to work. If he is registered he is sent for immediately.

But if the overseer has no one particular in view, again the employment manager and overseer get together and look over the available material registered and decide upon one they think will be satisfactory.

So far, in every sense of the word, the overseer has hired his man. On the other hand, I will relate an experience which will illustrate how the proposition is worked in an emergency.

One morning I got word that two of my hands were not coming back on account of trouble at home. This was without any previous notice and I needed someone very badly that day. I telephoned to the employment manager's office and told them how things stood. This was at 7:20 a. m. At 8 o'clock that morning I had one new hand and at 8:45 I had another hand to fill the other vacant job. These were chosen by the employment manager from the records, and both proved efficient. In case they had not I was not required to keep them as they were sent in subject to our approval and on the condition that they must make good.

I have tried to discuss the different phases wherein the employment manager helps the overseer directly in hiring and discharging an employee. I have only covered a small part of a service superintendent's activities. Personally, I like to look on the service superintendent as my private secretary. He takes off my hands the trouble of stopping and speaking pleasantly to people waiting to ask for jobs while I am particularly busy. These people are also kept out of the mill and in this way are prevented from interfering with the help by stopping and talking with them an hour or so at a time. Up-to-date records are kept both on my present working force and on a prospective working force which I would be unable to attend to. If I need somebody, the service superintendent looks that somebody up for me. If some of my help are in trouble or staying out they are looked after and checked up for me. In fact, the service superintendent looks out for all the details and occasionally makes some decisions for me—and that is where the value of a private secretary

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Settings for 7s and 8s Yarn.

EDITOR COTTON:

In answer to the question submitted in the January number by "Supt. (Ga.)," following are my opinions:

In reply to question No. 1, set the beater blade from the feed roll to the thickness of a closed two-foot rule. For years there was a demand for some form of beater for finisher pickers the action of which on the cotton should approach the carding rather than the beating process, to which it is subjected with the usual form of blade beaters. The united carding and beating action together with the progressive penetration produces a very fine sub-division of the fibers, while the peculiar form of each blade or bar very materially aids in the formation of a uniform sheet on the screens.

The Kirschner patent carding beater fills these requirements. The blades should be set the same as the bladed beater, that is, the space between the end of the pins and feed roll should equal the thickness of a closed two-foot rule.

"Supt's." 14-ounce lap is too heavy. However, if I were forced to run such a heavy sheet of lap, I would have the following settings:

Feed plate from licker-in, 12/1000 inch.

Licker-in knives from licker-in, top 12/1000 inch; bottom, 17/1000 inch."

Licker-in screen, ⅛ inch at nose.

Cylinder screen from cylinder, 22/1000 inch.

Licker-in from cylinder 10/1000 inch.

Flats from cylinder, 10/1000 inch.

Doffer from cylinder, 7/1000 inch.

Doffer comb, 8/1000 inch.

Flat stripping comb, 7/1000.

Back knife plate from cylinder, 17/1000 inch.

Front knife plate, lower edge, 17/1000 inch.

Front knife plate, top edge, according to the amount of strips desired, the closer to the cylinder the less the strips. Try a 17/1000 gauge.

If I had plenty of carding I would reduce my lap to about 11 ounces.

Next, "Supt." should make his card sliver as light as possible, and set the feed plate as close as possible to the licker-in. He should by all means use the 22 doffer change gear if he has plenty of carding.

As "Supt." seems to have plenty of carding, I would run a very light sliver on the cards so as to enable me to increase the doublings on the drawings. In such a case, the efficiency of the front drawing roll would be increased, for the reason that a larger portion of the boss of the front roll would act on a larger area but on the same number of fibers to the inch. This would reduce the frictional contact with the result of an evener sliver.

"Supt's." drawing sliver is too heavy and should weigh about 50 grains.

In reference to his third question as to roll settings for drawing and slubbers, for metallic rolls I would set as follows: Between the first and second rolls, center to center, 1¼ inches, for a front roll speed not exceeding 400 r. p. m. For a higher speed this setting should be increased another 1/16th of an inch. Between the second

and third rolls, 1⅜ inches, and 1¾ inches between the third and fourth rolls.

For leather rolls, between the first and second rolls, 1 1/16 inches for a speed not exceeding 350 r. p. m. on the front roll. For a higher speed, 1 3/16 inches. This wide setting is due to the leather rolls not being positive. Between the second and third rolls, 1 5/16 inches, and between the third and fourth rolls, 1¾ inches.

On the slubbers I would set as follows: Between the first and second rolls, 1⅛ inches for a front roll speed not exceeding 180 r. p. m. For a speed above that and up to 200, add 1/16 or ⅛ inch more according to the difference between the actual draft and figured draft.

"Supt's." actual draft is 7.5s divided by 1.25 which equals 6 draft. This of course is a very short draft, but his hang-up in the preceding processes spoils the work at the spinning stage. Using his own figures, I find

8.33 ÷ 64 = .130 hank finished drawing.

.48 ÷ .13 = 3.7 draft of slubber, practically.

1.25 ÷ .48 = 2.6 draft of intermediate, practically.

7s + 8s = 7.5 ÷ 1.25 = 6 draft on spinning.

The total draft on his drawings is practically 11 inches, which is also a short draft. However, I think he would get better results by reducing the slubber draft. Therefore, I would suggest the following hang-up: 11-ounce lap to the yard with a 45 grain card sliver, and a doffer speed of 12 r. p. m. 8.33 ÷ 45 = .185 hank carding.

Not disturbing the present draft on the drawing, we have

5.5 × 5.5 × 1.85 = 5.69. Doublings 6 × 6 = 36.

5.59 ÷ 36 = .155 hank drawing finished sliver, or 8.33 ÷ .155 = 54 grain sliver.

.48 ÷ .155 = 3.1 draft on slubber.

"Supt." will find a great improvement with this hang-up. By reducing the draft on the slubbers a more uniform yarn is certain to result. The hang-up given is necessary for the production of an even yarn for the reason that there is little opportunity to increase the doublings.

However, I hope what I have said will help "Supt.," for that is my only aim. Wash (Conn.)

EDITOR COTTON:

Replying to the questions of "Supt. (Ga.)" appearing in the January number, with reference to the breaking strength of yarns, I will give my views on the subjects under discussion.

A three-bladed beater, running 1,050 r. p. m., on the breaker picker, should have the feed rolls set to ¼ inch of the blades at the striking point.

On the finisher picker, the feed rolls should be set to 3/16 inch from the nearest points of the Kirschner beater at the striking point.

The Kirschner beater will give better results than the ordinary blade beater, as the teeth cards the tufts of cotton at the same time as it beats it down from the feed rolls, opening the cotton more, and letting the foreign matter drop through the grid bars.

In reply to "Supt's." second question, his card settings should be:

Screen. Front lip, ¼ inch from cylinder; center, front and back screens, 12/1000 inch from cylinder; back, 17/1000 inch from cylinder.

Back plate, 17/1000 inch from cylinder.

Licker-in, 7/1000 inch from cylinder.

The licker-in screen should be set so that the bottom edge is about ¼ inch from the teeth of the licker-in; this setting is important, as it regulates to a certain degree the amount of fly that drops under the back of the card.

The mote knives should be set as close to the licker teeth as possible without rubbing.

Feed plate, 12/1000 inch from licker-in teeth.

Flats, 10/1000 inch from the cylinder.

Percentage plate, according to the amount of strips desirable. 17/1000 inch from the cylinder is a good average.

The doffer change gear regulates the speed of all the parts of the card except the cylinder and flats, and does not change the draft, so the smaller the gear used, the slower the cotton is fed and delivered, subjecting the cotton to a longer period of time during the carding operation, making a better and cleaner sliver.

In answer to the third question, in reference to the roll settings for drawing and slubbers, on the breaker drawings the settings of the roll should be, from center to center: front and second, 1 3/16 inches; second and third, 1⅜ inches; third and fourth, 1⅜ inches. On the finisher drawing I should use: front and second, 1 3/16 inches; second and third, 1 5/16 inches; third and back, 1½ inches. These settings are for common rolls, and should be increased ⅛ inch over all if metallic rolls are used.

The rolls on the slubber should be set, from center to center, as follows: front and second, 1⅛ inches; second and back, 1⅜ inches, if not a stationary setting. The intermediate settings should be: front and second, 1⅛ inches; second and back, 1¼ inches.

By making 1.00 hank roving for the spinning, it would give a draft of 7 and 8 on the spinning frame, and reduce the draft on the intermediate to about 4.16. I think that this will give better results, owing to the coarse yarn being spun, than the present draft of 5.2 on the intermediates, and the short drafts of 5.6 and 6.4 on the frames.

Dey. (R. I.)

EDITOR COTTON:

I would like to extend my answers to the questions asked by "Supt. (Ga.)" in the January issue of COTTON.

1st. I prefer to run a 3-blade beater at 900 to 950 r. p. m. and set it at ⅜ to ½ inch from the feed roll, depending upon the weight of the lap.

I prefer the Kirschner beater to the blade beater on the finisher picker as it performs a combing action which makes an even lap and with less bunches than are found in a lap made with a blade beater. While a Kirschner beater will make more waste than a blade beater at the same settings, still I do not find the amount excessive. Run a Kirschner beater at 1000 to 1050 r. p. m. and set at ¼ to ⅜ inch from the feed roll. If making excessive waste with a Kirschner beater, change the setting of the grids rather than change the beater.

2nd. I would reduce the card sliver to 50 grains, which from 14 ounce lap, allowing 5 per cent for waste, would make a card draft of about 115, and speed the doffer at 11 r. p. m. Allowing 10 per cent for stoppage, this would give about 650 lbs. per card per week—a very good production.

The following are settings that I am using or have

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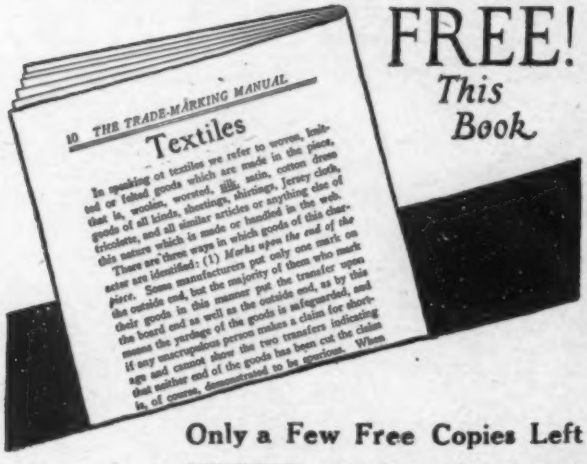

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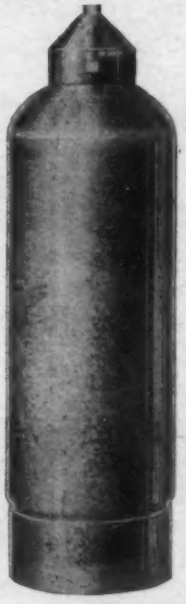

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used on the class of work I believe "Supt." to be running and which gave good results. Feed plate to licker-in, 10; first mote knife to licker-in, 22; second mote knife to licker-in, 17; licker-in to cylinder, 10; back knife plate to cylinder, 12 at the bottom and 29 at the top, or 29 both top and bottom.

Set the flats to 10 at all settings, or the first setting above the back knife plate to 12 and the rest to 10.

Front knife plate, 17 at the bottom and 34 at the top, depending upon the amount of strip to be taken out. The farther the top of the plate is set from the cylinder, the greater is the amount of strip. If set too close some of the fibers that should be removed by the flats will be carried around into the work, while if set too far away a continuous web of strip will result. I have my carder set the front knife plate so that the strip from one flat is connected to the strip of the adjacent flat by a few fibers.

Flat stripping comb to toe of flat, 7 gauge, as close as possible without striking the wire. Doffer to cylinder, 7. If running a heavy lap and low grade stock, I prefer setting doffer to a 10 gauge tight, because if set too close, the doffer acts as a stripping roll and short fiber and foreign matter enter the work that should be left on the cylinder.

Doffer comb to doffer, 17; cylinder screen at ¼ inch from cylinder at the front, at the middle, 58 gauge and at the back, 29. Set nose of licker-in screen, with which the fibers first come in contact, to licker-in at ⅛ inch; where licker-in screen is hinged to cylinder screen, 29 gauge.

3rd. If the drawings are crowded and "Supt." is using leather top rolls it would pay to change to metallic rolls which will increase his production approximately 30 per cent. I would not advise speeding the front roll over 400 r. p. m. Set front and second rolls to 1¼ inches between centers; second and third rolls, 1⅜ inches, and third and fourth rolls, 1½ inches. If the front and second rolls are too large to set at 1¼ inches, then use the following settings: first and second rolls, 1 5/16; second and third, 1 7/16; third and fourth, 1½ inches.

Slubbers, front and second rolls, 1¼ inches; second and third rolls, 1½ inches.

Intermediates, front and second rolls, 1 3/16 inches; second and third rolls, 1 7/16 inches.

Spinning frames, front and second rolls, 1 to 1 1/16 inches; second and third rolls, 1 5/16 to 1⅜ inches.

1.25 hank roving will produce better results in the spinning room than a heavier roving, but if he needs more production from the intermediates to keep his spinning frames running I would advise 1.10 hank. A coarser hank than 1.10 I would not advise, as he will not be able to get the production from the spinning frames that is obtainable when using a lighter hank roving, providing his spinners run the same number of sides.

Whatever settings "Supt. (Ga.)" may use I am sure that all will be interested to know what settings he finally uses and the results he obtains.

Kenduskeag. (Canada.)

EDITOR COTTON:

I submit below answers to the questions of "Supt. (Ga.)" in the January number with reference to settings.

1st. The distance between the blade of the beater and the feed roll is dependent principally upon the length of staple being run, the diameter of the feed roll and the thickness of the cotton being delivered to the beater. The longer the staple the smaller the diameter of the feed roll, and the thicker the cotton being delivered the further the feed roll should be set from the beater. On 1-inch stock, the distance between the blade of the beater and the feed roll should be from 3/16 to 5/16 inch, with a 3-inch feed roll.

2nd. My recommendations for "Supt's." card settings are as follows: Flats set to 10/1000 inch from the cylinder to the heel of the flat. Doffer from cylinder, 7/1000, tight to gauge. Licker-in from cylinder 10/1000, tight to gauge. Feed plate from licker-in, 12/1000 to 20/1000. Licker-in knives from licker-in, 12/1000 to 17/1000. Cylinder screen from cylinder, 22/1000. Back knife plate from cylinder, 17/1000. Front knife plate, lower edge, from cylinder, 17/1000. Front knife plate, top edge or stripping plate, according to the amount of strippings required from the flats. The plate is adjustable to regulate to some extent the weight of strippings to be taken out by the flats. The closer this plate is set to the cylinder the lighter the strippings, and vice versa to a limited degree.

3rd. Perhaps the most important point in the setting of rolls is the relative position of one pair of rolls to another, which position is governed by the length of the staple and the bulk of the cotton being used. In setting rolls there is one broad principle that must always be followed, the distance between the centers of each pair of rolls must always exceed the average length of the staple of cotton being used. If this were not so, the fiber would come under the action of the forward pair of rolls before it was released by the preceding pair and since the speed of the rolls increases with each pair toward the front of the machine, this would result in the fiber being strained or broken.

In addition to the length of staple being run, there are several other factors that should be considered in roll settings. Rapidly revolving rolls require wider settings than those having a slower speed, since with a slower speed the fibers would be given a sufficient amount of time to be drawn away from the mass of cotton with which they are intertwined without being strained. From this statement the conclusion should not be drawn that since the front pair of rolls in any frame revolves faster than the back pair, that the front rolls should be set farther from the middle rolls than the middle rolls are from the back rolls; this is not so as other circumstances to be considered overbalance that of the speed of the rolls. Since the speed of the rolls increases with each pair toward the front of the machine, the cotton, as it passes through the rolls, is greatly diminished in weight per yard from the back toward the front and since it is much easier to draw the fibers past each other when there is only a comparatively small number of fibers, the rolls nearer the front should have a less space between them than the two pair of rolls at the back. For this reason the space between each pair of rolls in a set increases from delivery to feed roll.

In running 1-inch stock, I would recommend the following roll settings on the drawing frame: 1st and 2nd, 1¼ inches; second and third, 1⅜ inches; third and fourth 1½ inches. On the slubbers I would set as follows: first and second, 1¼ inches; second and third, 1½ inches. On the intermediates I would use the following roll settings:

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Clock with case opened showing Dial in place and Partial Registration.

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first and second, 1 3/16; second and third, 1½ inches.

In my opinion, a 1.25 hank roving is a good hank for spinning 7s and 8s yarn. A. P. (Conn.)

EDITOR COTTON:

I have been reading the January, 1921, issue of COTTON and will try to answer the questions asked by "Supt. (Ga.)."

Question 1. Using 3-blade beaters at 1050 r. p. m., what distance should the beater be set from the feed roll? The stock is from ⅞ to 1 inch in length. The beater blade edge should be set three-sixteenths of an inch from the surface of the lower feed roll. This setting will allow the fibers to be struck from the bite of the rolls without causing them to be broken or to roll. It is assumed that the feed roll is about three inches in diameter. For the best results the speed of the feed rolls should be such that the cotton will receive about 50 blows for every inch, we know that this fiber is quite strong, but the grade being middling tells us that it is quite free from seed, leaves, etc., and does not require as many blows to loosen the dirt which it contains.

The beater on the finisher picker should be set the same distance as on the breaker picker and the speed of the feed rolls arranged to give 45 to 50 blows per inch. My suggestion would be to use the Kirschner carding beater as this beater will give better opening results because of the needle arrangement on the blades, which, besides giving the necessary blow, also combs the sheet as presented, thereby opening the cotton into a more loose and separated state, and this separated condition will help the carding as it relieves the licker-in of the card of some of its work in opening and the points of the licker-in wire do not wear so quickly. This enables the licker-in to pick the fibers up better to present them to the cylinder. We know from our experience that the greatest cause of poor work in some mills is neglect in the care of the licker-in wire, some mill men being of the opinion that when once covered the licker-in should last the life of the card and still produce good work.

Question 2. Making a 55 gr. sliver from a 14 oz. lap—what settings will be best for this class of work?

My settings would be as follows: Feed plate to licker-in, 12 gauge; top mote knife to licker-in, 12 gauge; lower knife, 10 gauge; licker-in to cylinder, tight, 10 gauge; back plate, lower edge, 19 gauge; back plate ,upper edge, 34 gauge; this will allow the fibers to raise from the cylinder and be in good position to meet the flats. Flats to cylinder a graduated setting, starting over the licker-in set as follows: one 11, two 11, three 9, four 9, five 7, thus bringing the flats a little closer to the cylinder as they approach the doffer. If not in sympathy with graduated settings, use a tight 10 for all setting points. Front plate, lower edge, 19 gauge. Set the upper edge according to the amount of strips required. As long as there are enough cards for slow carding the doffer should be set to the cylinder to a 7 gauge and run at as slow a speed as is consistent. Set doffer comb to a 10 gauge.

In going over the drafts on the machines I have found that they are good and in no case too high. The question of draft gears, on the card, which will be best to use, must be in conformity with the draft required to give the desired weight of sliver. From the lap given, allowing about 5 per cent waste on the card, we find the following draft $14 \times 437.5 \times .95 = 106.34$ draft; then this, divided into the draft constant, will give the required draft gear. Nothing has been said of the constant and not knowing it, either of the seven gears may be needed to produce the required grain of sliver under the conditions stated.

Question 3. Two processes of drawing are used but it is necessary to run them quite fast. Finished drawing sliver is to be 64 grains per yard to make a .48 hank roving. Give the best settings of rolls for drawing and slubber.

First of all there is the difference between 55 and 64 grains to pick up in two processes of drawing, or 9 grains per yard, then $9 \div 2 = 4.5$ grains at each process. The drawing should make a sliver of 60 grains per yard. This will equal a draft of $\frac{55 \times 6}{60} = 5.5$. The second drawing draft will be $\frac{60 \times 6}{64} = 5.62$. In setting the drawing rolls under these conditions, high speed and heavy sliver, I should advise settings as follows: Front and second roll, center to center, ¼ inch longer than the staple or 1¼ inches; 2nd and 3rd rolls, ¼ inch greater than the 1st and 2nd rolls, or 1½ inches; 3rd and 4th rolls ¼ inch greater than the 2nd and 3rd rolls, or 1¾ inches. To some mill men this will seem to be quite wide, but when we consider the bulk of massed fibers that are being presented, and the high rate of speed of the rolls, we can readily see that the rolls could not possibly do their best work of drawing, if set any closer.

On the slubber the rolls should be set 3/16 inch longer than the length of staple for front and 2nd rolls, and 3/16 inch greater than this for the middle and back rolls, which would be 1 3/16 inch and 1⅜ inch. The stock as presented to this machine is still quite bulky and heavy and needs quite a wide setting.

On the intermediate the rolls can be set to ⅛ inch greater than the staple for the 1st and 2nd rolls, and 1¼ for the 2nd and 3rd rolls.

The drafts on the fly frames and ring frames are good and I should not change them. If any change was to be made I should make a lighter hank and a shorter draft on the spinning.

I have also been reading about the meeting of Carders which was held at Charlotte and some very interesting discussions were held. It must be interesting to be at such meetings, but next best is to read of them in COTTON.

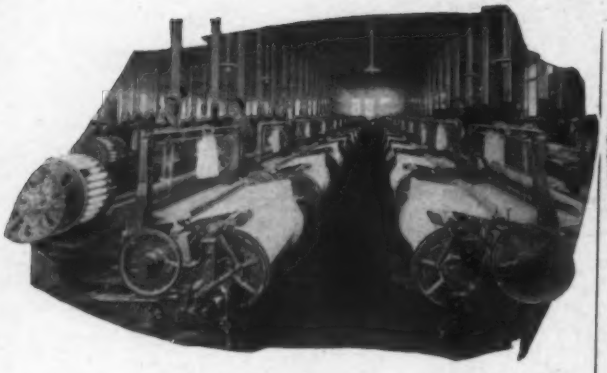
Carder. (Mass.)

The Mill-Man's Book of Particulars.

EDITOR COTTON:

Every man having charge of any amount of the work in any mill, from the second hand to the agent or treasurer, needs to carry a certain amount of information concerning his work on his person. This is usually done on a loose-leaf hand book of a convenient size to fit in an inside coat pocket. The book should have an index so that everything entered therein can be easily found.

The value of such a book cannot be overestimated, as it usually proves of untold help to its possessor. A mill



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ONE of our Lubrication Engineers recently investigated conditions in a large cotton mill that had been having considerable "stained goods" loss in its weave room.

All trouble from this source has been eliminated since the mill in question adopted his recommendations, and lubricated its looms with

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The Scientific Lubricant for Textile Machinery

The clinging properties of SLO-FLO prevented it from "throwing" and spattering. By adhering to the bearings, SLO-FLO not only put an end to stained goods losses but *reduced friction* to such an extent that the result was *an actual saving in power.*

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POWER plants are not only obtaining better lubrication by the use of flake graphite but they are effecting economies that often —in fact, not uncommonly—cut lubrication costs as much as 50 per cent.

Not only that—but there is less oil in the exhaust steam, which is a big factor in the case of condensing engines. The improved operation of engines and the reduced cost for oil repay many times the price of the special graphite feeders.

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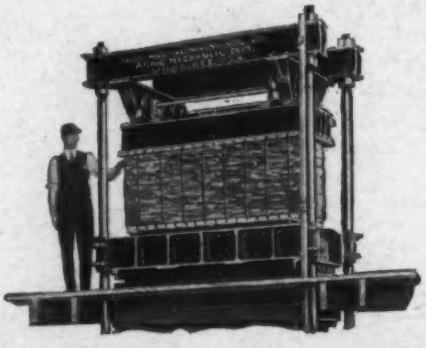

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without doors. As a result, the Acme Baler requires 75% less floor space, and turns out more bales per day.

Write for details.

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Southern Sales Representatives

THE LOVINGOOD COMPANY, Atlanta, Ga.

is composed of vast details which are too numerous to carry in one's memory. Besides it is unsafe to try to remember many facts upon which depend a great deal of the mill's welfare. When a superintendent is called upon to fill a new position, for example, it will not be long before he will be asked something with reference to his organization. His treasurer may ask him how many hands he may have on a certain process. He may ask what price is being paid for the work. The new superintendent may be asked what twist he is putting into a certain number of yarn, etc.

These questions usually come at the most unexpected time and in the most unexpected way, and very much sooner than the new superintendent expects. The bright man who can answer promptly is considered as a man "onto his job," but if he is caught without the goods on his person he is considered short of "something." He is usually left to guess what that "something" is of which he is short, but the treasurer has his private opinion of what it is just the same.

Therefore, it behooves the live-wire superintendent in a new job to busy himself at once—so soon as he lands on the job—to make up his book of particulars. This book will not only be found useful to him when he is quizzed by the treasurer, but it will also save him many steps in the future, and it will also answer many of his questions at any point, wherever he may be.

The progressive, coming man who hopes to become some superintendent's successor for the first time in the course of events in his career, would doubtless like to know something about what the up-to-the-minute man enters into his book of particulars to make him so very smart on the spur of almost any moment, so the careful reader of this article may prepare himself for business right on the spot, free of charge!

This book should contain a list of the head men under his charge and what they do. It should contain the times at which the whistle blows or the call bell rings, and the working hours—time of starting mornings and noons, dinner hour, and stopping time. It should also have the price paid for every job in the mill.

Power plant particulars, such as make, size and dimensions of the boilers and engines, water wheels, dynamos and motors. Also all pumps, size of main pulleys, belts, shafting and speeds of all main lines. Number and size of main buildings.

It should be posted with a list complete of the machinery in each department. The make, style, dimensions, together with speeds of rolls, cylinders and spindles, etc. Amount of drafts, twists, twist gears, and draft gears on all machines. Kinds of stock, what kind of yarns made from each, and what class of goods they are to be used for. How many kinds of goods made, and how many machines on each kind of goods.

It is also important for the new man to post himself concerning the various valves and what they are for, not overlooking the fire department and all apparatus.

In the card room, he should enter upon the pages devoted to this department the speeds of fans and beaters on the pickers, speeds of cylinders, doffers and combs on the cards, and the same way all through the mill. The number of card clothing wire on the card top flats, cylinders and doffers. How often the cards are stripped. The oiling system of the mill should come in for a thoroughly careful posting. Such as the names and kinds of oils used, and how often oiled and who does the oiling.

Sizes of both driver and driven pulleys on the various machines throughout the mill, sizes of rings, rolls, roll settings, number of ring travelers used, size of spindles and spindle whorls.

It is also very important for the new man to post his book carefully with reference to the system of stock and yarn number markings in his mill. This enables him to at once recognize and ascertain the stocks and the various goods made therefrom at sight, such as all slivers, rovings and yarns.

He should also keep an accurate account of the card grindings, scourings, and machinery which has been relined and leveled. So far as possible he should have a miniature floor plan of each room on his book.

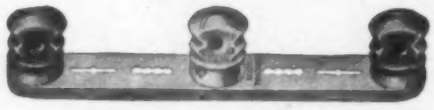
Lastly, he should post his book each day with reference to his progressive daily productions and wastes. If the superintendent has a large mill he may have the draftsman make out the tiny floor plans for his books, and have a clerk post all other details in his book. But in any event he must keep posted and know where to find the information therein contained very readily when it is called for.

Briefly, to show the utility of such an undertaking it may be mentioned, in passing, that for want of this important book of particulars, the new man has often been painfully misled and also led away off the path of success. For example, in one mill where this book was not provided and posted, the driven pulleys on the spinning frames were changed for larger ones unbeknown to the new superintendent, and the frames delivered less production at a much higher cost per pound for months before he found it out.

For want of getting a list of his loom speeds and driving pulleys, some looms were being driven too fast and others too slow, for a couple of years. He lost production on both the over-speeded and the under-speeded looms. On the over-speeded looms the loss was carried higher on account of the breakages and consumption of extra supplies. In another case, the speed of the engines were changed, causing loss.

The new man should post his book of particulars at once, and keep informed at all times on the entire situation within his mill. Logbook (N. Y.)

An attractive card has just been received from the Hazard Advertising Corporation announcing its removal to 7 East 42d Street, New York City. This change to more spacious and better appointed offices was necessary because of the steady increase in the volume of the company's business and the recent acquisition of several new accounts. It may be noted, as an index to future conditions, the importance now being placed upon intelligent and carefully prepared advertising. For example, such representative concerns in the chemical and associated industries as H. A. Metz & Co., Inc., Electro Bleaching Gas Co., Butterworth-Judson Corporation, Sandoz Chemical Works, Inc., Wm. E. Jordan, Inc., Industrial Pitch & Tar Products, Inc., Jordan Coal Tar Products Co., Inc., Meteor Products Co., Inc., and Ernst Bischoff Co., Inc., etc., are placing all their advertising through the Hazard Agency, which is specializing in accounts in this and allied fields.



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NATIONAL Brackets are especially adaptable for use in carrying power lines in industrial plants, as well as for outside construction work. They are practically universal in application; they do not require tie wires; they are furnished complete with insulators. Write for Bulletin 602.

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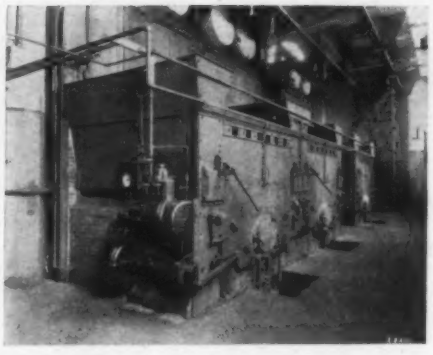


Saving Boilers

In 1916, the Spicer Mfg. Corp., of S. Plainfield, N. J., found that their output was being limited because of a steam shortage. They could not maintain 175 lb. steam pressure with low grade coal—the only kind they could get.

The thing ordinarily done under such circumstances is to install more steam making equipment—more boilers. Incidentally, this is the most expensive way to get more steam. It is the last thing to do instead of the first.

But the Spicer Mfg. Corp. installed four Detroit "V" Type Stokers under their 150 h.p. boilers. They saved the cost of new boilers. They got more steam at a fraction of the cost.

Indicated by the fact that in 1918 when they increased their h.p. capacity with two 300 h.p. boilers, they specified Detroit Stokers with Detrick Flat Arches.

Detroit "V" Type Stokers will enable your plant to reduce coal and labor bills. They will secure more steam from present boiler equipment.

Allow our engineers to show you how this can be done. Our Stoker Catalog will indicate some money saving possibilities that your plant may be overlooking. Let us send you a copy.

Detroit Stoker Company
7336 Woodward Ave., Detroit, Mich.
Branches: Chicago, Cleveland, Cincinnati, New York, Pittsburgh, Atlanta, Philadelphia, Boston.

SAVE COAL

Checking the Time of Machine Operation.

A recording device has been brought out by the Service Recorder Co., Cleveland, Ohio, which furnishes a graphic record of the actual operation time of different types of textile machinery. This was adapted from the well known "Servis Recorder" for motor trucks, also manufactured by this concern, with which motor truck owners have been favorably acquainted for several years past.

The utility of such a device on textile machinery is at once apparent. It can be used in connection with any make of counter or hank clock, on the machine, and will furnish a check on the actual hours the machine has been

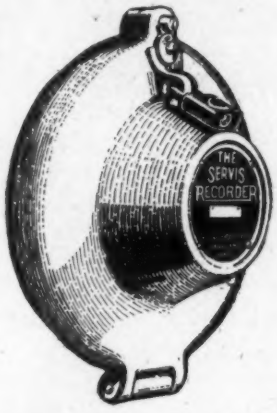


FIG. 1. SERVIS RECORDER COMPLETE, READY FOR ATTACHMENT TO TEXTILE MACHINE.

operated. A comparison of this record with the production record made by the counter or hank clock enables the mill manager or superintendent to work out an intelligent interpretation of the relation of the production to the time consumed. This would no doubt be very difficult, probably not possible, otherwise. Valuable and important information is very frequently necessary to be arrived at in connection with the record of a certain machine, for instance, the number of hanks turned off, to determine whether such a production is reasonable. The Servis

FIG. 2. RECORD OF LOOM OPERATION IN MILL RUNNING THREE 8-HOUR SHIFTS.

recorder fills this need, by recording the number of hours of actual operation.

This recorder is a simple device. In its utilization on motor trucks, the mere jolting of the truck while in motion sways a pendulum in the recorder, which in turn marks a rotating chart. Without this jolting effect, no mark is made on the chart, so that an idle truck does not record on the chart.

For textile machinery, it is necessary only to give to the recorder a slight oscillating motion. This movement may be produced by a cam or crank, or may be secured by attaching the device to some oscillating part of the mechanism of the machine—no matter what part—not too fast, just sufficient to move the recorder back and forth only while the machine is in motion. The requirements for attaching the recorder to the machine are simple.

The recorder makes necessary no figuring out of speeds nor allowances of any sort. It disregards all factors except the hours operated, which are faithfully and accurately recorded.

An illustration of the usefulness of this device was given by a large mill in which the working time had been reduced from nine hours to eight hours a day. The question arose with the management as to the actual relative operation of the machinery which was being delivered during the smaller number of hours. The Servis recorder showed conclusively that not only was the operation of the equipment actually less in accordance with the reduction in running time, but that it was also relatively less in

FIG. 3. RECORD OF TENTER FRAME OPERATION IN COTTON GOODS FINISHING PLANT.

proportion to each hour than had been the case during the longer day. This revelation resulted in a revision of the wage payment method at the plant from day work to piece work. Incidentally, it was also pointed out, it enabled the operatives to make more money.

The application of this recorder to such machines as tenter frames in finishing plants, drawing frames, slubbers, roving frames, spinning frames, warpers and looms, has given the first fundamental record of actual operations which has been easily available.

A record given by the device on loom operation in a mill running on three 8-hour shifts is shown at Fig. 2.

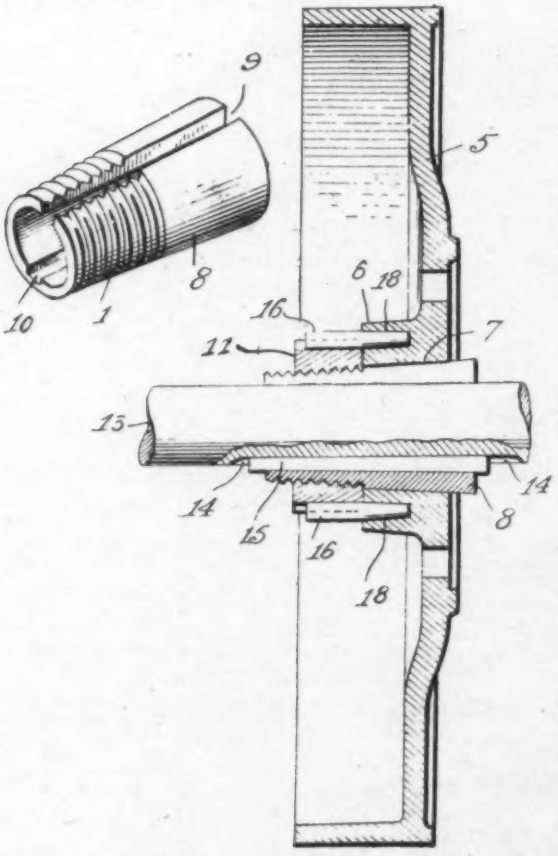
The record of a tenter frame operation in a cotton goods finishing plant, shown at Fig. 3, gives further information of another kind, in addition to showing the actual time the machine was in operation. An examination of this record will show that at about 4 p. m., the recording line is only half the normal width. This resulted from attaching the recorder to the machine in such a manner that at a slow speed of the machine, only half the normal oscillation was obtained on the recorder. Use of this can be made to indicate when the machine is running slowly due to a certain character of goods being put through.

One of the chief advantages of this recording device is

that it can be installed at a comparatively low cost. However, it can be used on one type of machine with equal facility as on another, and, it is stated, the fact that it may be changed readily from one type of machinery to another without change or adjustment to its internal mechanism is one of the biggest factors in promoting its wider use.

A Self Tightening Pulley Attachment.

Marion R. Casey, Ware Shoals, S. C., inventor of the Casey cam device and the Casey adjustable rocker shaft and parallel bearing, has recently brought out another invention known as the Casey self tightening gear and pulley attachment. This device is for the purpose of preventing gears or pulleys from working loose. It can



be used on any gear or pulley, but its most general adaptation is to the tight pulley on the head gear of a loom, and its use should prove a saving to mills having trouble with head gears coming loose.

The larger sketch in the illustration shows a sectional view of a pulley with the device in place. The pulley is indicated by 5; the hub of the pulley by 6; and 13 is the shaft. At 7 is shown the part of the pulley hub which is reamed out to allow the entrance of the bushing. This bushing, which is indicated by 8, is tapered on the outside, but is made level on the inside so as to fit the shaft; it is also threaded at the smaller end. When the bushing is put in place on the shaft, the nut, 11, is screwed in on the threaded part of the bushing. This pushes the pulley outward on the bushing and the slot in the bushing (shown at 9 in the smaller sketch) closes up and clamps the shaft. The bushing is held in place and is connected with the shaft by the key, 15, which fits in the key way, 14, in the shaft and which does not allow the bushing to move. The nut is held in place by the keys, 16, which pass through grooves in the side of the nut and into the hub of the pulley at 18. If the pulley becomes the least bit loose, the keys, 16, will automatically tighten the nut, pushing the pulley up on the tapered bushing, and thereby making the pulley tight on the shaft.

The smaller sketch shows the bushing with the slot indicated by 9; the key way, into which the key, 15, that holds the bushing stationary with the shaft, slides, is shown at 10; and 1 indicates the threaded part of the bushing.

Observations on the Carding Discussion.

EDITOR COTTON:

I have been going over the report, "Carders Discuss Practical Problems," on page 170 to 174 inclusive in the January number, and have been much interested in the discussions of the various carders and superintendents. To my mind, the report of Mr. Moore, of Clover, S. C., seems very much to the point, in that he says that the speeds on the beaters should be varied in regard to the length of the staple being run. This is absolutely true and if he had gone a little further he might have said that the settings of the feed roll to the beater should also be varied according to the length of staple used.

To my mind, three processes in the picking room, on cotton up to 1⅛ inch staple of middling or lower grade, is of distinct advantage. If the objection is made that this gives too much beating to the cotton, it is a simple problem to reduce the number of beats per inch, so that the cotton is not being mistreated. I consider that the proper place to take out foreign matter in the cotton is, as far as possible, in the picking, and there is no doubt there is more seed and leaf taken out with the three processes of picking than with two processes. Another advantage in three process picking, it seems to me, is that twice the doublings are secured than with two process picking, with the resultant evenness that comes from the extra process of picking. Of course, on cotton of longer staple than that indicated, two process picking is quite satisfactory. Contributor No. 29.

The cotton-producing states of the South for many years were satisfied to sell raw cotton to the world, to receive a single profit upon production and to concede to New England and other parts of the world the privilege of manufacture, and the benefit of the larger profits resulting—but no more. The South developed vision and now its own mills consume a large part of its raw product and wealth, and a new economic life has come to these people.—Rollin P. Grant of the Irving National Bank.

Mitchell-Bissell Company, manufacturers of porcelain guides for textile machinery, announce the removal, on February 1, of their office in New York to 334 Fourth Avenue. Their former location was 251 Fourth Avenue.

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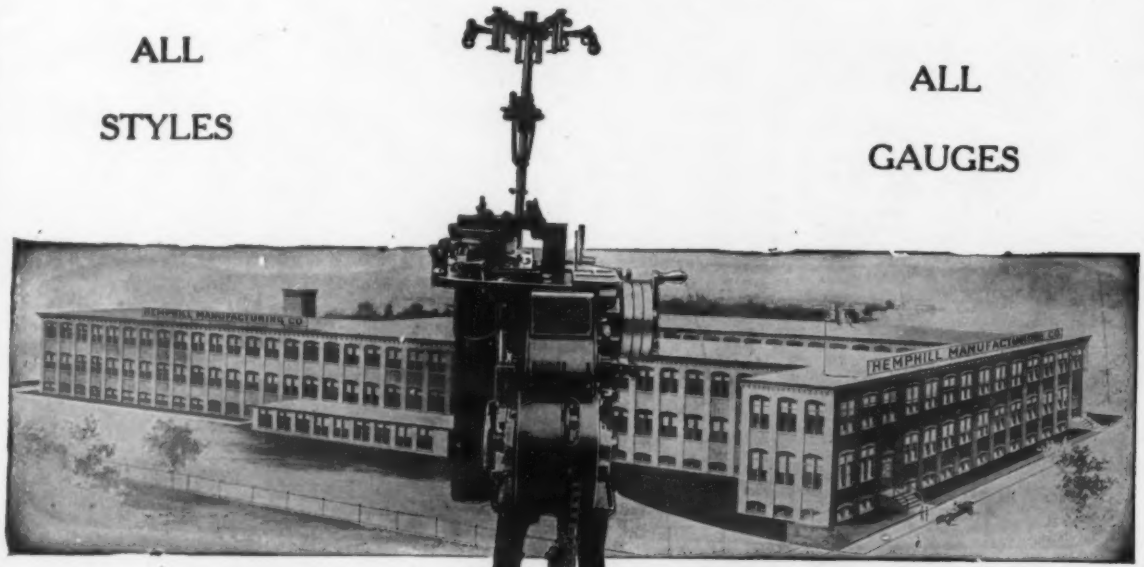

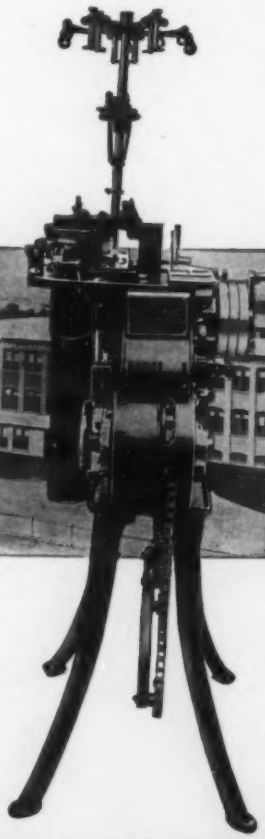

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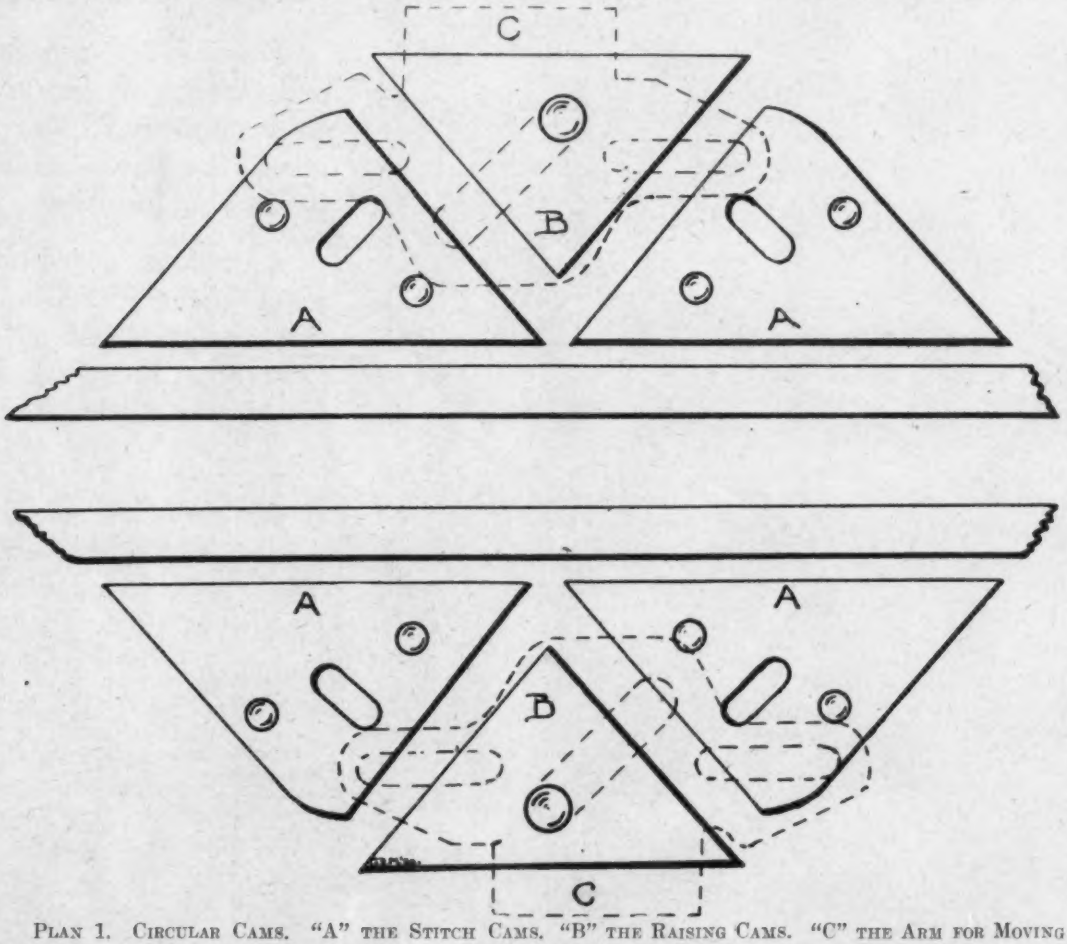
Simple Flat Machine Cams

BY G. R. MERRILL.

The kinds of cams present in a flat knitting machine determine the kind of goods or stitches which can be produced.

The very simplest type of cams, on a two-bed machine, is that which makes a ribbed fabric. There is a set of cams for each bed and each of these sets consists of three iron blocks, which are generally triangular in shape, except for the curve on one side. Two of these triangular cams, the stitch cams, are placed with a vertex downward, a short distance apart, and the third is placed with a vertex upward, in the space between the other two. The first two cams are known as the stitch cams, because they regulate the length of the stitch and the one between them is called the raising cam, because it raises the needles to get the yarn for new loops and to drop the old loops over the ends of the latches.



PLAN 1. CIRCULAR CAMS. "A" THE STITCH CAMS. "B" THE RAISING CAMS. "C" THE ARM FOR MOVING THE RAISING CAMS.

Plan I illustrates this simplest type of cam. The two stitch cams may be moved, at the angle and in the direction indicated, resulting in lowering or raising them and still keeping the raceway, in which the needle butts run, the same width. As these cams are moved downward, they force the needles down farther and consequently, draw a longer loop of yarn from the yarn fed. From the diagram, it is plain that only one stitch cam is used, while moving in one direction. The other cam comes into play when the cams move in the opposite direction. For one direction, then, only one stitch cam and one raising cam are needed.

Machines with these simple cams are very apt to be arranged so that it is possible to make a tube, as well as a ribbed fabric. To accomplish this, the raising cam is so arranged, that it may be moved vertically upward until it closes the needle butt raceway and lifts the cam high enough so that it does not come into contact with the needle butts. This movement is accomplished by the use of an arm, projecting from the cam carriage, which strikes stops on the frame of the machine. The arm is connected to the raising cam, and as it strikes the stop at one end of the frame, it throws the cam up, closing the raceway and throwing the cam out of action, while at the opposite end, the stop striking the arm draws the cam back into active position. The set of cams which act upon the needles of the other bed have this action reversed, so that, when one set of needles knit, the other set does not. With this type of cams, it is possible to make a tube in which the yarn always spirals around in the same direction.

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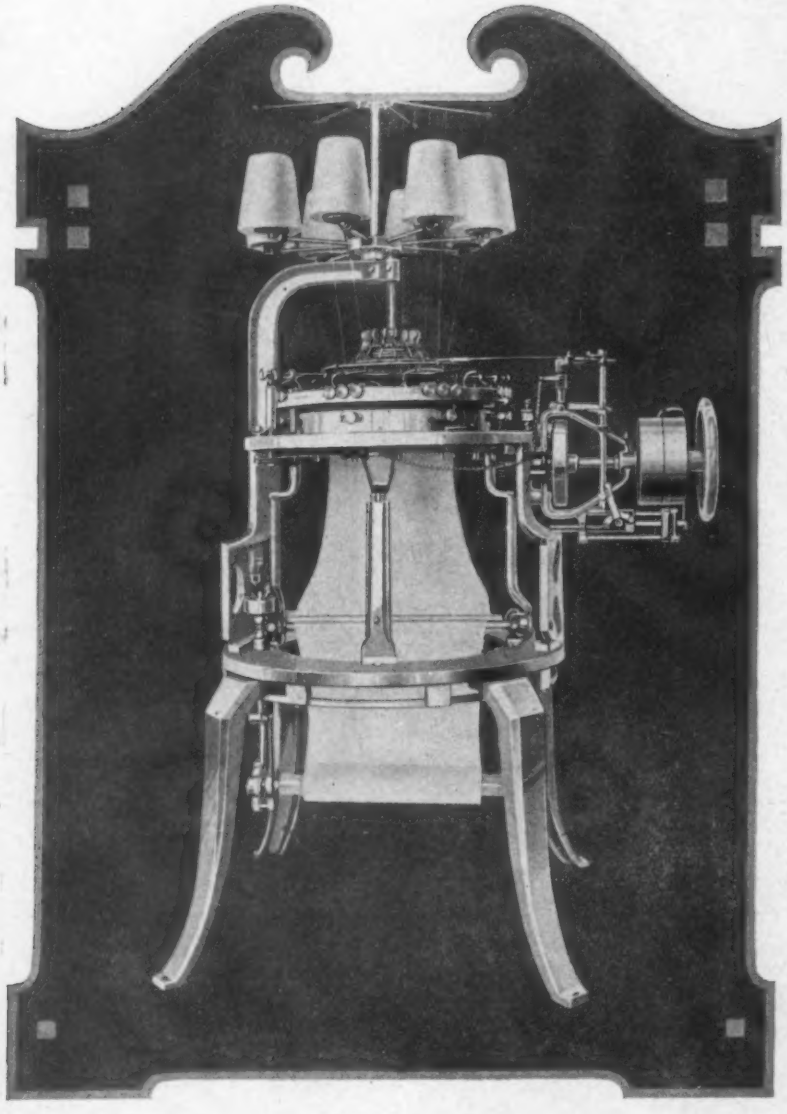

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A second type of flat machine cams is shown in Plan 2. The stitch cams are present but are slightly different in shape than those of Plan 1, as may be seen by reference to Plan 2. The raising cam is very different; there are really two. In place of the one solid piece are four pieces, the shapes of which are shown in Plan 2. The long horizontal piece takes the place of the lower portion of the one-piece raising cam. Two other pieces perform the duties of the sides of the raising cam. These two pieces are not fast, but are held by screws at their upper ends, so that they may swing.

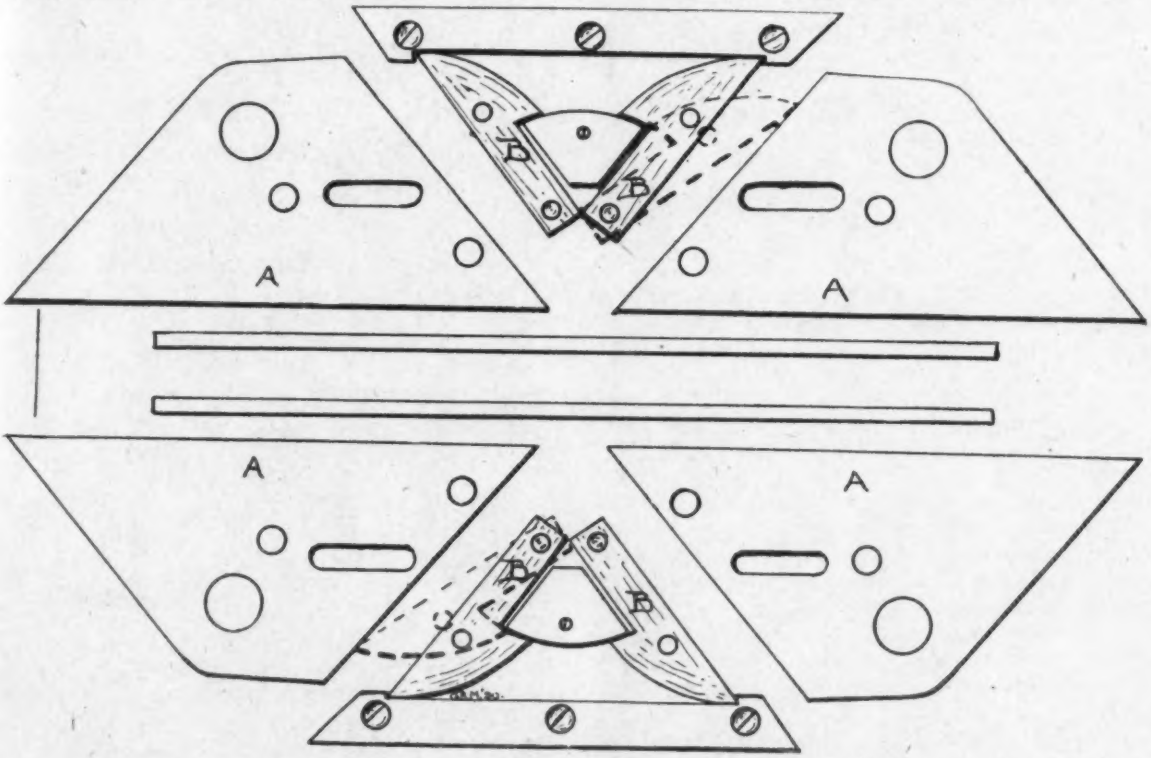
So long as these cams are down, they produce a rib stitch. Each of these cams may be held up, in a position such that the lower end is against the stitch cam, by a spring controlled with a handle on the outside of the cam carriage. When one of these cams is swung up, as is shown by the dotted line in the plan, the needles knit as the cams move in one direction and do not knit as the cams return. Should it happen that both the cams were lifted, there would be no knitting action in either direction.

When the lower cam carriage in Plan 2 moves to the left, with the small cam up as shown in dotted lines, the cams do not cause knitting, because the needle butts are allowed to remain in the raceway opened by lifting the left raising cam. The raising cam on the other side is down, but as it is held down by a spring only, the needle butts lift it by contact and slide under. As the carriage moves to the right, the right raising cam is down and the butts of the needles are forced up and knitting follows. As the needle butts are forced back down again by the left stitch cam, they come in contact with the left raising cam and, because it is held up by a spring only, force it down enough to allow them to pass. At these two movements of the cam carriage, the operations of the upper set of cams, as shown by the dotted lines in Plan 2, is just the reverse of those given for the lower set; or one set knits as the cams travel each way and so builds a tube, as do the simpler cams of Plan 1.

It is, then, possible to make a tube, if the diagonally opposite raising cams are lifted out of action. They may be those shown in Plan 2 or the other two, the only difference being the direction of the spiral of yarn in the finished tube.

With these cams, it is possible to knit on one bed only, and get a flat plain fabric, to use both beds and get a ribbed fabric, and to use each bed alternately and get a tube of plain fabric.

A third type of flat machine cams is shown in Plan 3.



PLAN 2. CIRCULAR CAMS. "A" THE STITCH CAMS. "B" THE RAISING CAMS.

The stitch cams of this type are similar to those of Plan 2, but the raising cams are quite different from either of the preceding types.

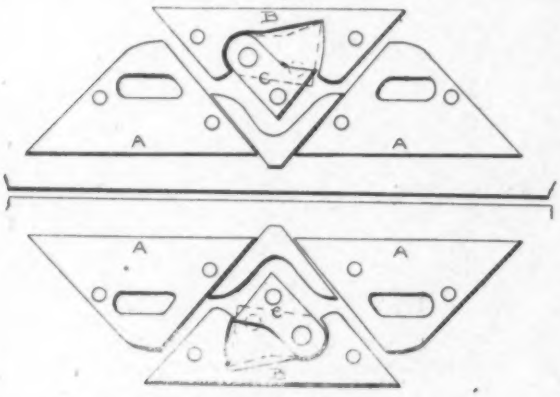
The raising cams consist of two pieces, the larger of which is fixed, while the smaller is movable.

These swing cams are controlled by small handles on the outside of the carriage. They may be held fast in the position shown by the full lines and when so held, they make a plain flat fabric, if one bed is used, and a ribbed fabric if both beds are used. On the other hand, when these cams are not held, they may be in the position shown by the full lines or they may be swung down to the position shown by the dotted lines in Plan 3.

As the cam carriage moves to the left, the needles under the control of the lower cam are forced up by the solid portion of the raising cam. At the top of this solid cam, the needles come in contact with the upper corner of the swing cam. This cam is so designed that the pres-

sure against this upper corner causes it to swing about its pivot and take the position shown by the full lines. As this happens, the needles are carried high enough to drop the old loop over the end of the latch, to take a new loop and then knit as they are forced down by the right stitch cam.

As the carriage moves to the right returning, the solid raising cam again lifts the needles to the level of its upper edge, but this time the needle butts strike the swing cam in such a way that it is forced down and the needles are not lifted higher. This action lifts the needles high



PLAN 3. CARDIGAN CAMS. "A" THE STITCH CAMS. "B" THE RAISING CAMS. "C" THE SWINGING CAMS.

enough to get new yarn or loops, but does not lift them high enough to drop the old loops over the ends of the latches. Consequently, these needles, when they are forced down by the left stitch cam have the old loop and an additional new one.

The needles which are controlled by the other set of cams go through similar actions, but in the reverse order, that is, they tuck as the carriage moves to the left and knit as it moves to the right.

This action is known as "tucking" and any stitch which involves the taking on of a new loop before dropping the old one, as has just been described, is known as a "tuck" stitch.

There are two possible arrangements of tuck stitch which are quite common. The simpler is an arrangement under which one set of needles tucks every other course, and is called a half cardigan stitch. The second arrangement is one in which each bed tucks on alternate courses, and gives a full cardigan stitch.

Georgia Manufacturers to Meet in Athens.

The annual convention of the Georgia Manufacturers' Association will be held in Athens, Ga., on April 13 and 14, and every manufacturer in the state is invited to be represented at this meeting. One of the purposes of this association is to substitute for individual single-handed effort the united effort of all the manufacturers of the state in dealing with the many difficult problems that affect alike all branches of industry in the state, and an endeavor will be made at the annual meeting at Athens to help in the solution of the questions and the determination of policies for industrial procedure upon which the prosperity and progress of the state so greatly depends.

A New Drinking Fountain.

A patent was recently issued on a drinking fountain which is said to be a great improvement over the ordinary fountain. This invention embraces an umbrella-shaped protector which completely covers the orifice of the jet except when the water is turned on. When this is done the protector is automatically raised, after which the water is discharged at a slight angle. The protector is raised by the pressure of the water, by means of a piston so arranged that the protector is raised before the water can be emitted, and it is raised to such a position that it does not come in contact with the stream.

This "Protectajet" bubbler, as it is called, is now being utilized by the Central Brass Manufacturing Company, Cleveland, Ohio, in connection with their Quickool refriger-

ating drinking fountain, as well as in a wall non-refrigerating fountain, a pedestal non-refrigerating fount and a bubbler for use in connection with lavatories and a bubbler for use in connection with sinks.

The value of this improvement lies in the fact that it protects the drinking fountain jet from contamination by mouth secretions, perspiration and germ-laden dust, which is said to lodge on the jet of an ordinary fountain. The Central Brass Manufacturing Company, who embody these bubblers on their products, claim that to be sanitary, a drinking fountain must meet three conditions: it must have the jet so located that users' lips cannot come in contact with it; it must have an angle jet so that water will not fall back on it; and itmust have a protected jet so it will automatically stay free from contamination.

C. M. Wall & Son, manufacturers of box shooks, operate two box factories, one located at Southmont, N. C., and one at Thomasville, N. C. These two mills have a daily capacity of around 60,000 feet of pine lumber—three car loads of box shooks. They use North Carolina pine lumber altogether in their shooks, and make a specialty of the textile trade. C. M. Wall is manager and C. C. Wall is general superintendent.

The Knit Goods Market

The best that can be said of the market for hosiery is that, at the restricted rate of buying thus far in 1921, there must be a steady flow of orders as the season advances. Whether it will be possible to widen the very narrow gap between production cost and mill price will depend on the extent to which manufacturers limit output.

Jobbers' orders are, for Spring, mainly for spot or nearby delivery, few distributors having bought or tried to buy far beyond March. Yet mills making some of the more exclusive types of wool hosiery already are selling for the winter of 1921-22. Heather stockings, for example, more especially for women, have been bought in fair quantity by some of the better houses.

Heaters for next winter will run into considerable money if the craze among high-class houses for the ornamental does not abate. A leading mill in wool hosiery in February brought out heathers with hand-embroidered clocks in a variety of color combinations. Hand-embroidered triple clocking adds $21.00 a dozen to the price of a plain stocking. Double clocking makes it cost $17.00 more, while $9.00 is added for a single clock.

The mill which introduced the clocked heathers is embellishing in like manner its line of ladies' fashioned silks, not knitted on flat machines, but seamed, as though in the full-fashioned class. A stocking selling at $10.00 a dozen without the ornamentation costs jobbers $19.00, $27.00 and $31.00 a dozen respectively for the single, double and triple clocked.

It was a woman who was responsible for the more expensive clocking on heathers. She is a knit goods buyer for a jobbing house, and observed that, while men were wearing "hand" embroidered hosiery, women were restricted to nothing more startling than a sort of jazz color scheme worked out in the dyeing of the yarn. She copied a number of embroidered designs from men's socks, and adapted them to women's stockings. The clocked heathers "took" among the exclusive class with the price; a manufacturer's salesman met the plagiarist by chance, passed the cue to the mill, and the clocked heathers were launched as a selling proposition early February. It is understood the mill, in three weeks, sold up for the season's production, which, however, it had been planned to restrict for experimenting with the then novelty. Embroidery promises to increase the popularity of heathers for the next season.

In contrast with the willingness of a jobber to plunge in buying for anticipated requirements of something new and striking, there is present a degree of conservatism as to staples that makes it difficult for the average manufacturer to plan with safety for a season's approximate production. He, therefore, is operating at a serious disadvantage, under a heavier overhead than the traffic will bear, and thus far is able to do little better than swap old money for new. This is true of low end, combed and mercerized lines. A mill might sell more cases at jobbers' prices if it could make specified deliveries of assortments.

Jobbers have affected to believe that there were surplus stocks on which they might draw as wanted. Such stocks have become, to a great extent, depleted since the buying spurt set in early in January. Desired colors and sizes were not immediately available, and buyers were doubtful about the expediency of placing orders to be made up at prices higher than those ruling for distress goods. In consequence, they have not been able to get all that was wanted at the time it was wanted; so that it would appear there is a good repeat order business in prospect. The volume will be determined when buying for April and May deliveries begins in earnest.

Delivery of much of the hosiery bought in February in two to five case lots was so urgent that buyers frequently required shipment by express, the excess of cost over freight necessarily being tacked onto the price to the retailer, to be passed along to the complaining consumer. One recent three-case lot of cheap stockings was sent by express from a mill in North Carolina to a jobber in Boston.

Mills selling to the retail trade direct frequently are required to ship by parcel post. One such mill, in Tennessee, is filling approximately one hundred orders a day, comparatively little of the hosiery being forwarded by freight.

In buying for spot delivery and specifying express or parcel post shipment, merchants necessarily disclose their bare shelves. Probably not in many years have distributors been operating on such light stocks as in the last few months, and there is no indication that they intend to operate otherwise than in the most grudging manner. Retailers who normally bought a case are content with a dozen, and jobbers with whom a 100-case lot was a common order usually will not risk a commitment for more than ten to twenty-five.

A southern mill regarded an eighteen-case order as worthy of mention. It was larger than the average, but it illustrates buyers' conservatism. The order called for seven of the mill's numbers of men's, women's and misses' in black, white and cordovan, and twenty sizes, a total of 420 assortments, which, if divided uniformly among the numbers and colors, would give the jobber about two and one-half dozens of each—not enough for one road salesman for a week's small business among small retailers.

Retailers operating with mills direct have been buying more liberally, relatively, than jobbers, yet the latter assert the retailer is the obstacle in the way of even sub-normal distribution. It is a question whether jobbers are pushing road sales with pre-depression vigor. There are higher travel expenses that must be met, and sales have declined in volume, so that there is a largely increased cost of doing business through men on the road. This, however, seems to be no bar to the efforts of the direct-to-retailer mills. The advantage should be with the jobber, as a salesman carrying a variety of lines obviously ought to turn in orders representing more dollars than one who is limited as to samples. Perhaps the retailer mills are better organized from the road-merchandising standpoint. Then, too, as they sell under nationally known brands, at prices with which the trade is familiar, their mail order business doubtless runs heavier than that of the average large jobber, as to some specific line, whether it be hosiery or other knitted goods.

Jobbers probably were hit harder by cancellations than

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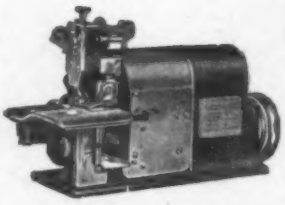

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were manufacturers selling the retail trade, and therefore are prone to proceed with ultra-caution. In one distributing center jobbers who are practically out of the market say they have sold their trade to the limit of customers' credit, and will operate on a very small scale until maturing accounts have been taken care of. There are as many explanations for slack buying as of buyers.

Hosiery prices are too low. It is generally conceded that mills represented at the meeting in Charlotte, N. C., some weeks ago, would have fared better had they indicated better than replacement cost as the value to the trade. They went to bed-rock to start buying, and since have been operating in a sort of hap-hazard way without seeking compensation for their efforts. It seems as difficult now to put prices within a peg or two of where they ought to be as it was to interest distributors so long as they had a few dozens in stock.

Every advance, no matter how slight, and regardless of the fact that there is practically no return for manufacturers on cost, is met with a protest. When a jobber came back two weeks ago with a duplicate order for a line of women's mercerized hosiery which he had bought at $3.00 a dozen he found the price had been moved up 12½ cents. He refused to buy, and grumbled as much about advances as jobbers formerly did over declines on the ground that there could be no stability while values were receding.

Some lines of cheap hosiery, however, are moving since prices were advanced. This is true more particularly of 144-needle half hose. Pennsylvania mills, which a few weeks ago, were selling at 25 cents to 50 cents a dozen now are getting five to ten cents better. One line has been moved up to a dollar a dozen, and a black and white and brown and white mixed numbers, of high grade, is being taken at $1.10. A like price has been established by a Pennsylvania mill for 176-needle full seamless socks, prices at some mills running as low as a dollar a dozen, with $1.05 regarded a happy medium.

A Philadelphia jobber bought misses' 28-ounce ribs from a southern mill at a dollar. Another mill in the South, after selling at that price, is reported to have advanced to $1.05, and it is understood a new price with some mills will be $1.10. These figures apply to spot and nearby delivery. Other prices, for like delivery, follow: Ladies' rib-top cotton, two pounds, $1.75, advanced from $1.65; ladies' 200-needle, double-carded, $3.05, order at $2.55 declined; ladies' 220-needle, combed, $1.85 to $2.10; women's mercerized, $3.00 to $3.12½ for 220-needle, $3.25 for 240-needle, and $2.75 for 260-needle; mercerized half hose, $1.55 for 176-needle, single sole, cotton top, advanced from $1.45; $1.70 for same gauge, double sole, mercerized top, and $2.25 to $2.60 for standard 220-needle.

Full fashioned silk hosiery is moving in small volume. Most of the Philadelphia mills are idle or operating on a much restricted basis, the operatives having struck some weeks ago against a 15 per cent reduction from the post-war peak. Mills in operation elsewhere are not pushed in supplying the needs of their respective customers, and Philadelphia manufacturers, notwithstanding the strike, are losing no business, so that it would appear the Union is good for a long period of idleness, unless it accepts the new wage scale. In the seamless mills in Philadelphia reductions ranging from 20 to 30 per cent have been effective for some weeks, and there is an abundance of idle operatives who would accept employment at the lower scales.

Seamless silk hosiery has not been active for some time. A manufacturer with a surplus is offering ten-thread, 19-inch boots, machine clocked, at $7.25, and jobbers are not wild over the line at even that philanthropic figure.

Cotton hosiery exports in December last were 643,444 dozens, valued at $2,106,448, and brought the total for the twelve months of 1920 up to 11,576,601 dozens, of an invoice value of $37,895,327. The larger shipments in December were: To Australia, 124,582 dozens; Cuba, 73,050; Chile, 56,426; Argentina, 49,803; Mexico, 17,213; Canada, 16,238; England, 52,992; Rumania, 28,867; Netherlands, 15,519; Peru, 23,633; Dutch East Indies, 16,159; British South Africa, 12,159.

A total of 806,094 dozens of artificial silk hosiery, valued at $6,909,713, was exported last year. The principal exports in December were: To Australia, 6482 dozens; New Zealand, 2351; British South Africa, 2191; England, 15,134; Argentina, 13,062; Cuba, 2103; Chile, 2474.

Cotton hosiery exports in 1920 gained 2,009,226 dozens, and artificial silk lost 786,961 dozens.

A better attitude toward light underwear developed among jobbers during February, their operations being conducted on a very small scale, however. Meanwhile several mills had booked orders for winter underwear for next season.

Spring underwear at the start of the year was bought on what jobbers now refer to as a speculative basis. They took just a little, in the fear prices might decline. The trend has been in the opposite direction, several mills making ladies' vests having advanced by 10 to 35 cents a dozen. One line was moved up by easy stages from $1.10 to $1.45. It sold at $1.20, but has not been moving at the higher figure.

Retailers apparently have been buying more heavily than jobbers anticipated, for many of the latter have placed repeat orders, and some of the repeats have been duplicated. An important New York State mill, which had been idle several months and opened its lines in January, is about sold up for the entire season. It should not be forgotten, however, that its operations, normally running over a period of six months, in this instance will have been confined to about three and one-half months, so that the season's production will be small, and, as prices are very low, the manufacturers will be scantily compensated.

As in low end hosiery, there have been distress lots of light underwear, and this accounts for the difficulty experienced by manufacturers in selling in even reasonable quantity and obtaining a price showing a fair business margin. Several weeks ago 28 cases of fine bal briggans which had been bought by a commission house for export at $7.50 a dozen, were dumped at $3.75, whereas the mill price for spring deliveries is $5.50. The exporter's customers had cancelled their orders; he needed the money and a jobber got the lot at $1.75 a dozen under the market.

In another instance a large order, which was to have been placed with a mill, was filled by a jobber at far under the mill price. The jobber, too, was in need of funds, and regarded the primary market selling season had so far advanced that he was afraid to hold on longer.

It is believed in the trade that merchandise made available to retailers at prices which spell heavy losses to sellers

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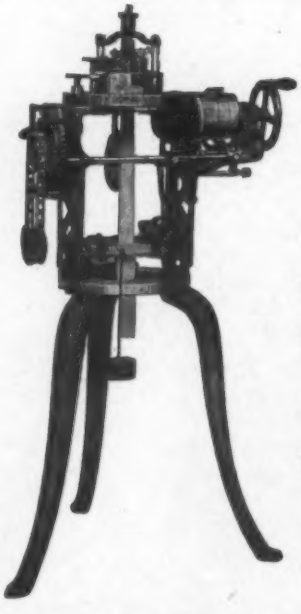

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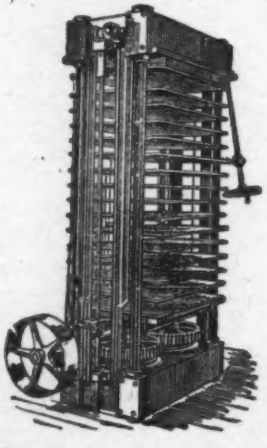

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will be sold in the summer in competition with goods carried over or bought this season; that competition generally will develop with the approach of summer and be carried through the year. It is realized that low price goods cannot be sold to the consumer at exorbitant figures and that dealers will be prone to profit by whatever advantage accrued to them in their purchases, rather than mark prices up to conform to those of competitors not so well situated, as was the practice two years and less ago.

Department heads in large retail stores frequently were taken to task by their superiors if it were found a competitor was getting a higher price, and up went the price in the store which had not gone the limit. These same department heads are in no less trouble today if their prices are higher than in a competitive store. "If Doe can sell this line at $2.50, why have you got it priced $3.19?" is a question that was put to one department manager. "We want it understood that Roe can sell as low as Doe," he was reminded, and down came the price.

The consumer has been waiting for just such a turn, and likewise the mill. When the trend to competition becomes general, through force by the consumer, it is felt there will be considerably more buying by the public; that the result will be more persons in remunerative employment and a steadily increasing purchasing power. Competition promises to bring a more lasting solution of trade and economic problems than all the talk of business scientists and the theorizing of recognized captains of finance and commerce.

Jobber and retailer have been able to offer light underwear for the present season at prices which mean actual competition, and the former have been taking business beyond their fondest expectations. A buyer for a large retail store in Galveston, Tex., who did a little buying recently, describes the clothing and haberdashery business in that city as in larger volume than for the corresponding period of 1920. In El Paso there is a fairly brisk trade with Mexicans crossing the border, and it is noted they are running to better grades of underwear, and silk hosiery as well, than formerly. While Chicago is reported buying little underwear for the jobbing trade, reports of very satisfactory business come from Denver and beyond. Jobbers in New York, where they go from one extreme to the other, appear to be in the class with those in Chicago. Pittsburgh, Pa., and Cleveland, O., are reported as temporarily dull spots, due to the large number of persons out of employment. Philadelphia is operating sub-normally in underwear. In Baltimore, less than 100 miles distant, jobbers are reported much depressed for the present.

Cuba is perhaps the more disturbed of the export fields. A salesman recently returned from the island reports many employers paying their help with what he describes as promissory notes, which merchants usually refuse to accept, and thefts of merchandise held on vessels have become so common that consignees are suffering heavy losses from this source alone.

Underwear, therefore, has been lagging for a variety of reasons. For a time it looked as though jobbers would pass the 1921 season by and take only as wanted. This notion has been dissipated in the last several weeks, and now the indications are jobbers in a few weeks will be in competition for deliveries. It does not seem likely that production can be pushed late in the season for meeting such a demand as seems probable of developing.

While it was assumed winter underwear would not be offered before the first week in March, several mills making wool and wool mixed garments already have shown samples and booked some business, without solicitation on the part of mill representatives. An indication of the drop in prices is given in those on two lines of a Central West mill. A garment which in December, 1919, opened for the season at $72 is priced $45. Another number, sold by the mill for the current winter at $22 a dozen, is being taken by a few jobbers at $15.50. Reductions on woolen underwear, it appears, will range from 35 to 40 per cent. At least one mill is guaranteeing its prices to delivery, shipments in May, June and July.

There has been no announcement of opening heavy cotton underwear, which, it is believed, will be held back until about March 7. A northern mill has mentioned an indicated price of $12.50 for 16 pound cotton union suits, which is $5.50 under the price at the opening for the present retail season. It is suspected there are heavier carryover stocks of cotton underwear than of wool.

Ball Bearings on the Line Shaft.

A recent test made on a line shaft installation by the Transmission Ball Bearing Co., Buffalo, N. Y., shows some interesting figures. The shaft in question was 1 11/16 inches in diameter and 22 feet long, running at 170 r. p. m. This was driven by a 3½ hp. motor. Following are the details of the power test:

Load	Babbitt	Chapman Ball	Saving
Motors, line shaft and loose pulleys	1.47 hp.	1.27 hp.	.20 hp.
Average working load	3.35 hp.	2.81 hp.	.54 hp.

COST OF INSTALLATION.

Four 1 11/16-inch Chapman ball bearings	$58.24
Cost of Erection	10.00
10 per cent depreciation charges	6.82
6 per cent interest charges	4.09
Total investment	$79.15

SAVING IN POWER.

.54 hp. × .746 k.w. × 2,700 hrs. × .03 cents k.w.-hr. = $32.63
$32.63 = yearly saving in power.

SAVING IN OIL.

Babbitt—4 bearings × 1/40 gal. × 12 oilings × .40 cts. gal. =	$ .48
Ball —4 bearings × 3/16 lb. × 1 greasing × .32 cts. pound =	.24
	$ .24

.24 cents = yearly saving in oil bills.

SAVING IN LABOR.

Babbitt—4 bearings × 1/15 hr. × 12 oilings × .40c hr. =	$1.28
Ball— 4 bearings × 1/12 hr. × 1 greas'g × .40c hr. =	.13
	$1.15

$1.15 = yearly saving in labor.

RETURN ON INVESTMENT.

Yearly saving in power	$32.63
Yearly saving in oil	.24
Yearly saving in labor	1.15
Total yearly saving	$34.02

$34.02 = 43 per cent return on the investment.

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The Yarn Market

While the activity of the cotton yarn market of New England has apparently slumped backward from its more active position that marked the advent of the New Year, the trade on the whole are more cheerful as to the future than in some months past. The present relaxing of interest and reduction of sales is considered but temporary by wise men in the trade, a sort of reaction from the flurry of business a few weeks ago that has been brought about partially, at least, by the unsettled state of the raw cotton market.

Spinners, meantime, are striving to keep their machinery in motion and their organizations together. They are succeeding to a certain extent in securing new business and the balance of the production is going into stock yarns. Some of them have resumed full time operations but without their full complement of employees, while others have increased their working schedules by several hours per week. Disposal of yarns spun under these conditions is more or less a moot question, the keener minds of the trade not ignoring the possibilities that such stocks may be a burden on the market in the future.

Improvement in the cloth and finished goods situation, however, provides a possible outlet for surplus yarns, the question being whether ultimate consumers will respond to lower prices in sufficient numbers to absorb enough to require increased production. At the moment the outlook certainly gives promise of better business. New Bedford mills are employing fully 20 per cent more operatives at this writing than in the middle of January. Lawrence mills have resumed nearly full time operations the latest plant affected being the Pacific Mills cotton department. In Salem, the Naumkeag mills have received sufficient business to warrant full time production and even a night shift.

Thread mills in the Blackstone Valley are resuming business which must eventually be reflected in revival of interest and sale of thread yarns. The J. & P. Coats thread manufacturers of Pawtucket, R. I., have resumed operations on a 48-hour week schedule and also started a night shift in the spinning department. This concern alone employs 2500 on day work and has previously been on two or three days a week in some of the departments. The Weypoyset Company of Central Falls also announced that a night shift would be run in their warping and spinning departments, employing 350.

Tires, the greatest single factor in the consumption of long staple cotton yarns, while stagnant at the moment, give indications of increased business. The Goodyear Tire & Rubber Company report receiving orders in January that totaled 50 per cent increase over the December business booked, and plan to increase their production of tires from 8000 to 18,000 daily as soon as arrangements are completed for refinancing. The reported operation of more than 9,000,000 automobiles in the United States shows an increase in the number used of about 1,000,000 over the corresponding period of last year. Warm, unseasonable weather in New England this winter has induced many motorists to use their cars who otherwise would have stored them. Results of the recent New York automobile show are also declared satisfactory.

The yarn trade look confidently forward to the passing of the emergency tariff bill providing duty on cotton and cotton goods as a source of prevention to further depression in the domestic markets. New England textile men appearing before the Ways and Means Committee in Washington in support of the proposed tariff disclosed some interesting data on the textile industry. A. H. Lowe of Fitchburg, Mass., told the committee that more than 1,500,000 persons were dependent on the cotton manufacturing industry for a livelihood. Mr. Lowe filed the brief asking protection for the industry, which was signed by himself and Nathaniel F. Ayer, William F. Garcelon and Robert A. Morey, all of Boston, in addition to others. Mr. Lowe also said that the industry as a whole did not believe it wise to stop their machinery, throw their labor out of work, and turn their market over to foreigners even if the other nations did owe us upwards of $12,000,000,000. He further said that the cotton manufacturing industry would have been bankrupt by the Underwood tariff, had not the war practically shut off imports.

Meantime the yarn trade are looking forward to the rejuvenation of the buying power of the public, encouraged by lower retail prices as the ultimate solution of the present depression. Consumption of cotton and cotton goods throughout the world is at a low point and many factors are responsible. One result of these conditions is the reduction in prices of cloth in New England 50 per cent over peak prices of some months ago. Jobbers, however, report reductions of 30 per cent while retailers show the desire to continue war time profits by holding values above levels commensurate with reductions all along the line despite their recent price "slashing."

Current prices on representative numbers used in New England follow:

Southern Single Carded Cones.	
10s	26 @27
12s	26½ @28
14s	27 @28½
16s	27½ @28½
18s	28 @29
20s	29½ @30
22s	30 @31
24s	30½ @31½
30s	37 @38
40s	43 @45
Warp Twist—Weaving Yarns.	
10-2	27 @28
12-2	28 @29
14-2	28½ @29½
16-2	29 @30
20-2	30 @32
24-2	32 @33
30-2	36 @37
36-2	39 @40
40-2	43 @45
Northern Carded.	
10-1	30 @31
16-1	32 @33
20-1	36 @37
26-1	38 @39
30-1	39 @40
40-1	45 @48
Northern Combed.	
10-1	42 @43
16-1	45 @46
18-1	47 @48
20-1	48 @49
26-1	53 @56
30-1	59 @61
36-1	65 @67
40-1	65 @70

It would seem from a study of the Philadelphia cotton yarn market for February that the uprush in business which came during the previous month and which seemed to many to be the forerunner of a steadily ascending market was only a "fling," inasmuch as the market as a whole, after two weeks or so of prosperity, again receded into that

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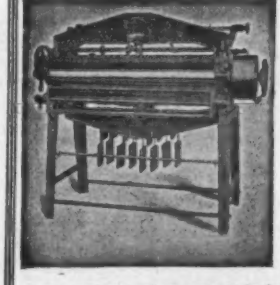

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condition of stagnancy which has prevailed for eight or nine months.

Southern carded yarns, which appeared to be the leaders in the upward price movement in January, were at the beginning of the next period, only two and three cents—an estimated average—above their low levels. No stimulating influence of any character seemed to come during the month, with the result that in that time, these yarns lost all their January recovery in prices, and in some instances new low price levels were reported. In southern single carded skeins and warps, 24s, 26s and 30s dropped to their previous low figures of 31, 32 and 33 cents a pound, respectively.

For the first week, prices, weakened in the previous week, continued to soften in some counts. Southern carded yarn rates receded some, with which came a settling in other sections of the list. Carpet and upholstery yarns were sluggish. The consumers of these grades did little as buyers—the yarns they use were not participants in the January rise, as far as any sales were reported. Further, in this first week, the lowest prices were quoted for 8s three and four ply tinged tubes, and for 8s three and four-ply hard twist waste yarns. However, these concessions failed to make a market.

Southern carded knitting yarns eased off further in the second week. The knitters seemed to be gradually withdrawing their support from the market and bought less freely, which resulted in a shading of quotations on knitting yarns, particularly in the coarser counts. The dullness of the first of the year seemed to be approximated about this time, with spinners finding it difficult to find outlets for their production. Reports from the New Bedford market, however, indicated a marked increase in the volume of inquiry with a considerable flurry of actual buying. It was stated that both combed and carded yarns shared in this interest.

The third week brought little relief from this inactivity, and there was slight deviation from the previous hand-to-mouth policy on the part of the buyers. They bought, seemingly, only when yarns were needed to cover their requirements—at any other times, neither price nor quality seemed sufficient to induce them to purchase.

Southern combed peeler yarns, especially the medium and finer counts, were conspicuous during the month for their firmness. While in some instances shadings were made on these yarns, these concessions were for the most part in the coarser counts. Healthy advances were reported in the finer counts, 80s/2 being reported as bringing $1.10 along the latter part of the month.

For the month as a whole, the market generally witnessed a paucity of buyers, with perhaps a little heavier offering in practically all counts, and further price concessions on the part of spinners.

Recent Philadelphia quotations follow:

Southern Single Skein.

4s to 8s	26	10s	27
12s	27½	14s	28
16s	28	20s	28½
24s	31	26s	32
30s	33 @34		

Southern Single Warps.

8s	27	10s	27½
12s	28	14s	28½
16s	28½	20s	29
26s	33 @33½	30s	34
40s	43 @44		

Carded and Upholstery Yarns in Skeins.

8-3-4 slack	26
9-1-4 slack	26
8-3-4 tinged tubes	18½ @19½
8-3-4 hard white warp twist	26
8-3-4 hard twist waste	17½ @18½

Southern Two-Ply Skeins.

8s	26	10s	26½
12s	27	14s	27½
16s	28	20s	28½
24s	31	26s	32
30s	33	40s	42

Southern Two-Ply Warp.

8s	27	10s	27½
12s	28	14s	28½
16s	28½	20s	29
34s	32	26s	33
30s	34	40s	43 @44

Southern Two-Ply Combed Peeler Skeins and Warps.

20s	52 @55	24s	55 @57
30s	58 @60	40s	70
50s	75 @80	60s	85 @80
70s	95	80s	$1.05@$1.10

Southern Frame Spun Carded Yarn on Cones.

8s	25½	10s	25½
12s	26	14s	26½
16s	27	18s	27½
20s	28	22s	28½
24s	29	26s	30
30s	31		

30s double carded	34@35
30s tying-in	28@29
40s	42

Northern Mule Spun Carded Yarn Cones.

10s	30	12s	31
14s	32	16s	33
18s	34	20s	35
24s	37	26s	38
30s	42	40s	48

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	44	12s	45
14s	46	16s	47
18s	48	20s	49
22s	50	26s	55
28s	57	30s	58
36s	62	38s	64
40s	65		

Among the Knitting Mills.

The Standard Knitting Mills, 2436 South Hoover St., Los Angeles, Cal., have filed notice of organization to manufacture knit goods. M. R. Yates, 2514 Gleason Street, and C. O. Ast, 3937 Wisconsin Place, head the company.

The Harder Knit Hosiery Co., New York, has been incorporated with a capital of $10,000, by M. F. McGowan, 664 Putman Avenue, and others.

The Beacon Knitting Mills, Inc., New York, have filed notice of increase in capital from $10,000 to $35,000, for general expansion and improvements in its works for the manufacture of knit goods specialties.

The Jersey Knit Ware Corporation, manufacturer of knit goods specialties, formerly at Royersford, Pa., is now operating at its new mill at Spring City, Pa.

The Pulaski Knitting Mills, Pulaski, Va., are planning for the installation of new machinery to be used in the manufacture of cotton hosiery. Similar installations will also be made at the Radford Mills to increase production.

Direct from Mills Co., Inc., New York, has been incorporated with a capital of $100,000 to manufacture knit goods and hosiery, by C. A. Capron, J. W. Cramer and H. Feldman, 266 Keap Street, Brooklyn.

The Comet Knitting Mills, Brooklyn, N. Y., has been incorporated with a capital of $25,000, to manufacture knit goods products, by Irving Muckler, Clarence Berwin and Rae Berwin, 220 Wyckoff Avenue.

The Regal Knitting Co., Brooklyn, N. Y., a New York corporation, has filed notice of dissolution under state laws.

The Barton Knitting Mills, New York, has been incorporated with a capital of $10,000 to manufacture knit goods specialties, by M. and S. J. Pinsker and M. Lippman, 753 Beck Street.

E. W. Robischon, Inc., 1133 Broadway, New York,

manufacturer of hosiery, etc., has filed notice of increase in capital from $25,000 to $100,000.

H. Hillelson & Son, Inc., New York, has been incorporated with a capital of $300,000 to manufacture hosiery and cotton knit goods specialties, by I. Krinsansky, S. Berkowitz and M. Axel, 10 East Forty-third Street.

The Sexton Mfg. Co., Fairfield, Ill., manufacturer of knit goods products, will ask bids early in the spring for the erection of a new two-story building, 50 x 150 feet and 50 x 90 feet, of L-shaped construction, to cost about $50,000. Various types of machinery will be installed for increased production.

The Irvington Knitting Mills, Inc., Brooklyn, N. Y., has been incorporated with a capital of $10,000, to manufacture knit goods products, by L. and S. Miller, and A. Anton, 1108 Avenue L.

The United Knitwear Mills, 200 Fifth Avenue, New York, has filed notice of reorganization with an active capital of $262,500, with $250,000 in preferred stock and 2500 shares of common stock, no par value. The company specializes in the manufacture of cotton sweaters, and other knit goods products.

The Baitler Knitting Mills, Inc., New York, has been incorporated with a capital of $5,000 to manufacture knit goods, by J. M. Langer and S. Baitler.

The Spring Knit Wear Mfg. Co., New York, has filed notice of dissolution under state laws.

The West Branch Knitting Co., Milton, Pa., manufacturer of cotton underwear, has resumed operations at its three mills at Milton, Shamokin and Lock Haven, respectively. The plants which have been closed since late in December are insured capacity production until summer owing to a large order for the United States Navy and Marine Corps recently placed with the company.

The Elkay Knitting Mills, Inc., New York, has been incorporated with a capital of $30,000 to manufacture hosiery and other knit goods specialties, by J. and C. Leber and S. Katz, 269 Quincy Street, Brooklyn.

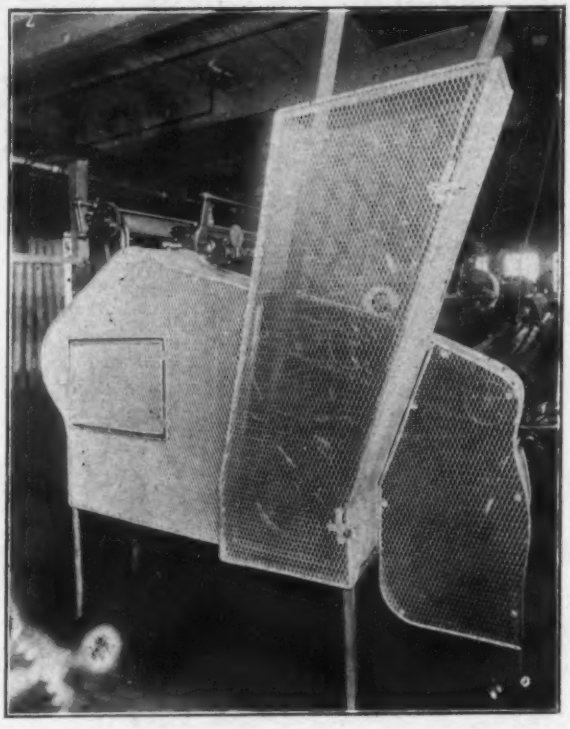
The Everstrong Knitting Co., Syracuse, N. Y., has filed notice of increase in capital from $10,000 to $50,000.

The Moorhead Knitting Co., Harrisburg, Pa., manufacturer of hosiery, etc., has commenced operations at its new branch plant at Hollywell Avenue, Chambersburg, Pa., with Merle Saunders in charge.

The Ortess Knitting Mills, Inc., New York, have been incorporated with a capital of $15,000 to manufacture textile products, by H. Ortner, W. Seligson, and L. Tessler, 817 Park Avenue, Brooklyn.

The Eminent Knitting Mills, Inc., New York, have been incorporated with a capital of $15,000 to manufacture knit goods, by R. H. Hagens, H. VonSchuckmann and C. E. W. Schelling, Yonkers, N. Y.

Hudig & Veder, cotton controllers, Rotterdam, are sending out a booklet which contains information concerning the Rotterdam cotton business; a complete parity table for converting pounds into kilos, and vice versa; a distance-table; a table of British weights and equivalents; and a table of tare of American and East-Indian cotton. They are also issuing a shorter parity table, from which can be seen at a glance the weight in kilos for any parcel of 50 or 100 bales when the weight in pounds is known, and vice versa.



Courtesy National Safety Council.

A NAPPING MACHINE GUARD.

The 17th Annual Knitting Arts Exhibition of the National Association of Hosiery & Underwear Manufacturers, to be held in the Commercial Museum, Philadelphia, on May 2, 3, 4. 5 and 6, is to be the greatest ever held, considering the many applications for space being received at the office of Secretary C. B. Carter, 40 South Seventh St., Philadelphia. The new arrangement of exhibit spaces being inaugurated with this year's exhibition, whereby every space will be a corner space, with an aisle on each side, seems to be taking well with the prospective exhibitors and arrangements have been made to care for a larger number of exhibits than was first anticipated.

The annual convention of the National Association of Hosiery & Underwear Manufacturers will be held in Philadelphia during Show Week. It is also announced that America's first annual Knit Goods Sales Conference will be held in conjunction with the Knitting Arts Exhibition this year.

Edward R. Ladew Company, Inc., New York City, tanners and leather belt manufacturers since 1835, have appointed the Charlotte Supply Co., Charlotte, N. C., as their jobbers at that point, where a complete stock of Flintstone belting will be carried. A sales and engineering department will be maintained as well as a repair department.

This company has also opened a branch store at 93-95 South Forsyth St., Atlanta, Ga., which will be in charge of D. H. Cassell, sales manager in the southern district. An ample stock of belting and leather specialties will be carried there, with the usual facilities for special work and engineering service.

Liquid EBG Chlorine

Are You Protected

by that insurance of service in delivery that is only possible where any size container can be provided?

Our container equipment which includes cylinders, ton drums and tank cars is a sufficient guarantee against any delay in satisfying your requirements.

Electro Bleaching Gas Co.

PIONEER MANUFACTURERS of LIQUID CHLORINE

Plant: NIAGARA FALLS, N.Y.

Main office 18 East 41st Street New York. *Chicago office* 11 So. La Salle St.

CORTRIGHT METAL SHINGLES

Right Over the Old Roof

There's no mess or bother when you lay Cortright Metal Shingles. And you don't have to expose the contents of your building to the weather.

Just lay Cortright Metal Shingles over the old roof. They last a lifetime and protect building from fire, wind and rain. We'll send our book, "Concerning That Roof."

CORTRIGHT METAL ROOFING CO.
Philadelphia — Chicago

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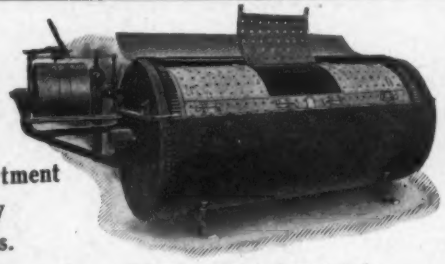
100 Pounds Each Compartment Capacity 1200 Lbs. Per Day.



Other sizes, also steel storage tanks built to order.

IMPROVED STEEL ROTARY DYEING MACHINE

Manufactured by

ROME MACHINE & FOUNDRY CO. - ROME, GA.

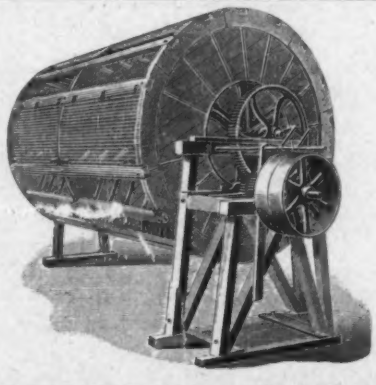
Write for Prices

DYE HOUSE MACHINERY

Oxidizers are built with spur gear and also with worm gear drive. Also makers of Dye Becks. Oxidizers, Tom-Toms, and dye house machinery, to specifications.

Write us.

SALEM IRON WORKS, Winston-Salem, N. C.



FOR HALF A CENTURY
we have manufactured

MILL CRAYONS

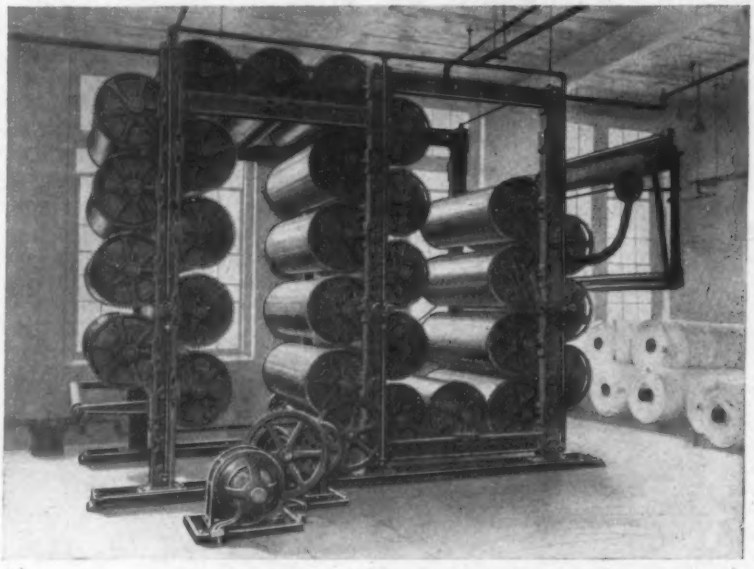
Nearly fifty years ago we started in as pioneers.

THE "LOWELL" CRAYON
is made right by men who *know how* to satisfy the demands of the textile field.

COTTON, WOOLEN AND WORSTED
mills find them just soft enough to mark the finest materials without injury and yet hard enough to wear well.
Contain no oil or grease.

LEAVE NO STAINS AFTER BLEACHING
Fifteen colors and white.
Write for color card and prices.

Lowell Crayon Company
LOWELL, MASS.
Original Makers of Mill Crayons.



Drying Machine. 28 Cylinders

WEEK in and week out, year after year, for 100 years, Butterworth Finishing Machinery has become more and more closely associated with the finest appearing fabrics made.

The users of Butterworth Finishing Machinery are as proud of their work as we are.

FINISHING
Butterworth
MACHINERY

Bleaching Machines	**Soaping Machines**
Drying Machines	**Tentering Machines**
Singeing Machines	**Mangles (all kinds)**
Mercerizing Ranges	**Calenders (all kinds)**
Hydraulic Presses	**Color Kettles**
Dyeing Machines	**Cell Dryers**

H. W. BUTTERWORTH & SONS CO.

Established 1820

PHILADELPHIA

PROVIDENCE OFFICE
Tuck's Head Building

Canadian Representative
W. J. WEST & WAY COMPANY
Hamilton, Ontario, Canada

Here's a Gilt-edged Investment:

A Satisfied Employee

A satisfied employee is always a good investment.

Contentment among workers, at home and on the job, means bigger and better production.

And contented employees stick—breaking in green hands is expensive at best.

These are some of the advantages which The Ware Shoals Manufacturing Co. of Ware Shoals, S. C., had in mind when it wrote as follows of the operation of its American Mill Village Laundry:

> "The laundry you equipped and installed has not only proved a great convenience to our people by giving them an opportunity to get their washing in a satisfactory manner at a low cost, but it has also been a great benefit to the mill in these times of labor scarcity by giving a number of women the chance to work regularly who were forced to stay out one or two days a week to wash, before we had a laundry."

American laundry specialists designed the Ware Shoals Mill Village Laundry; American construction engineers supervised the installation; American demonstrators trained a crew of operators and made them skillful.

The reward of such thoroughness is a Mill Village Laundry which is delivering the service promised and more.

And Ware Shoals satisfaction will be your satisfaction when you have restored washday to your productive calendar.

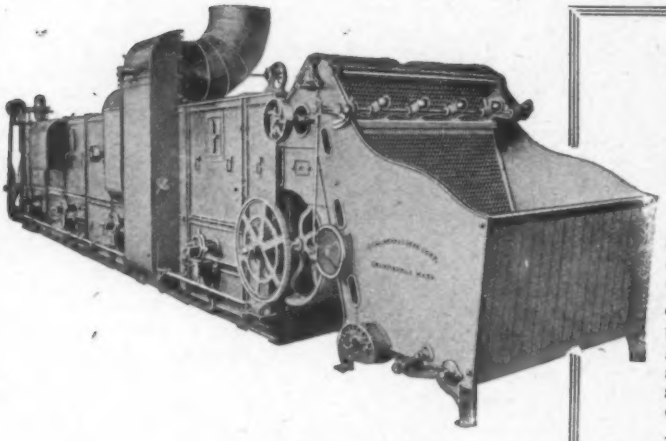
It will cost you nothing to investigate the American Mill Village Laundry.

Write today.

The American Laundry Machinery Company

Specialty Department C, Cincinnati, Ohio

This composite factory group shows the manufacturing plant of The American Laundry Machinery Company, the world's largest producer of laundry equipment, and originator of the American Mill Village Laundry. The service of this organization is sold with every American Mill Village Laundry installation.



The Last Word in Dryer Efficiency

Sargent Dryers mark progress in Dryer Development comparable to that made in other fields of mechanical endeavor. They contain the latest and most up-to-date improvements.

They are favored with a natural preference because they are designed on basic principles of air circulation, conveying, and general drying apparatus construction, which have had the approval of discriminating mill men and drying engineers for many years.

In the Sargent Dryer these principles have been combined and refined, making a complete machine which is unexcelled.

For drying cotton, linters, wool, hair, flax and other classes of raw material.

C. G. SARGENT'S SONS CORPORATION
GRANITEVILLE, MASS.

Fred H. White, Southern Agent, Charlotte, N. C.

SARGENT DRYERS

COCKER HOSIERY DYEING MACHINE

THIS machine has been thoroughly tested out with all colors and under all conditions, and is guaranteed to give the very best results possible in the dyeing of hosiery.

The stock is carried in four perforated metal containers equipped with one removable head on each container, and the containers mounted on Spiders in such a manner as to permit of their being loaded and unloaded quickly from the machine.

The Spiders carrying these containers are revolved in the vat *in one direction.*

Machines are furnished with either belt or motor drive.

Points of Advantage in This Machine That Must Be Considered

1st—Matting and chafing of the stock is entirely eliminated.

2nd—Percentage of re-dyes is reduced to a minimum.

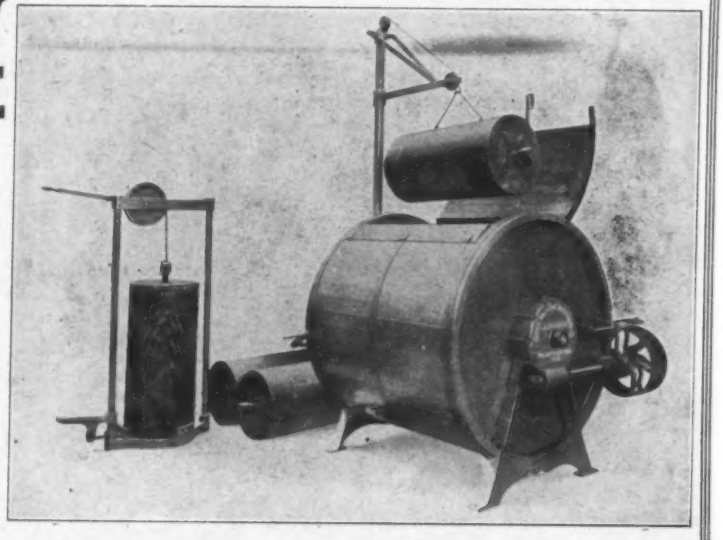
3rd—Different sizes and descriptions can be handled in one dyeing without confusion.

4th—Time required for loading and unloading machine reduced to a minimum.

5th—Absolutely level dyeings on all colors.

6th—Minimum of power required for operation.

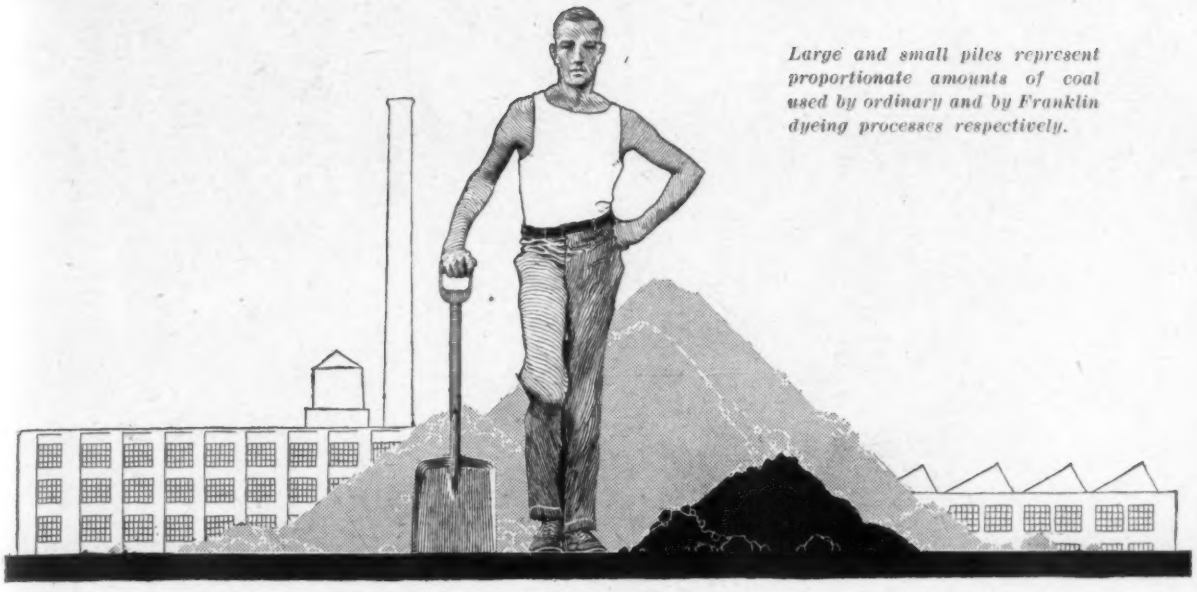
For further particulars and prices write or wire.



Cocker Machine & Foundry Co.

GASTONIA, N. C.

Builders of Textile Machinery.
Warpers—Beamers—Balling Attachments—Wrap
Dyeing Machinery—Reels



Large and small piles represent proportionate amounts of coal used by ordinary and by Franklin dyeing processes respectively.

Among Other Things Franklin Dyeing Machines Will Save Four-fifths of Your Coal Pile

FRANKLIN Process Machines dye *Wound*-packages and jack-spools in a concentrated bath, the packages being contained in a tightly closed kier, with only one gallon of liquor to a pound of yarn.

If you are not using Franklin Equipment you are using from 4½ to 20 gallons of liquor to each pound of material:—i. e. 4½ *to* 20 *times as much steam as is necessary.*

Disregard for the moment waste caused by the escape of excess steam into your dye-house with resultant depreciation of your building; consider only the enormous waste of fuel under the old dyeing method.

Suppose the old equipment colors 5,000 pounds a day and the cost of steam is one cent per pound of material dyed. In a year you have spent $15,000.00 for your dye-house steam.

ADVERTISEMENTS which follow this one will tell you of remarkable economies in floor space, yarn, labor, dyes and chemicals made possible by the use of Franklin equipment.

Perhaps the cost is more; in any case the *Franklin Process will save at least 4/5 of the amount.* That fact has been proven in our own dye-houses in Providence and Philadelphia and in our customers' dye-houses all over the textile world. We know of one mill employing the old method, that uses fourteen boilers to produce dye-house steam, and they color about what we do in our Providence dye-house with TWO boilers.

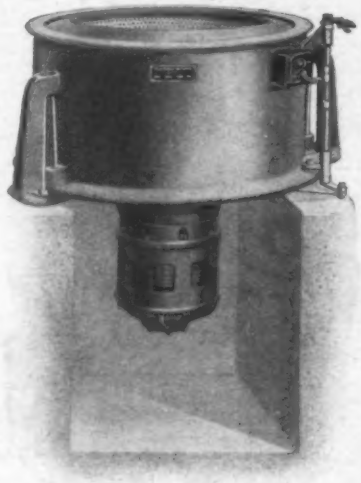
Is not a possible 80% saving in your dye-house worth a two-cent stamp to ask for further information; worth a few minutes of conversation with a Franklin Process representative?

FRANKLIN PROCESS
Philadelphia CO. Manchester, Eng.
PROVIDENCE, RHODE ISLAND, U.S.A.

Job Dye Houses in All Three Cities.

FLETCHER WORKS

ELECTRIC UNDERDRIVEN HYDRO EXTRACTORS



The Extractor with One Moving Part.

Built with 42″, 48″ and 60″ Baskets

NOW is the time to equip your plant with the most modern and effective Centrifugal Extractor of its type on the market today. Perfection of motor construction marks a further step forward of this widely known extractor—equally adapted for piece goods, silk, hosiery or yarns—and the demand has kept pace with our ability to make deliveries.

Rotor mounted on basket shaft
No centrifugal clutches or couplings
No belts to endanger operator
Push button control and interlocking brake
Oversized ball bearings give operating economy
No complicated mechanism to get out of order
Induction motor prevents excessive speed
Basket accessible all around

For more than a half-century this house has been building centrifugal extractors of the highest grade, and has been foremost in developing machines which will stand the wear and tear of every-day use. That is why you will find Fletcher Works—(Schaum & Uhlinger)—"whizzers" which have been working year after year for decades—we can say generations in many instances.

We Build for Service—and on Proved Mechanical Precepts

FLETCHER WORKS

Glenwood Ave. at Second St., Philadelphia, U. S. A.

REPRESENTATIVES:

R. R. Street & Company
28 N. Clinton Street
Chicago, Ill.

Thomas B. Whitted
Realty Building
Charlotte, N. C.

DURABLE K-W UNIVERSALLY USED

KLAUDER - WELDON
DYEING - BLEACHING-SCOURING MACHINERY

The many hundreds of Klauder-Weldon Machines now in use have, by their accomplishments, steadily and irresistibly built up a reputation that has made "K-W" synonymous with the "World's Best Dyeing, Bleaching and Scouring Machinery."

What better proof of the superiority of any machine than the word of many users?

Our interest in upholding the K-W reputation means that you MUST be satisfied, and our suggestions to prospective purchasers are made with the view toward solving any dyeing, bleaching or scouring problem.

Write today for K-W Literature

THE KLAUDER-WELDON DYEING MACHINE CO.

Jenkintown, Pa., U. S. A.

H. G. Mayer, Southern Agent,
Realty Bldg., Charlotte, N. C.

DRYING

EVERY TEXTILE DRYING NEED is best supplied by an efficient, dependable, fire-proof "Proctor" Dryer, capably designed and built by drying specialists of forty years' experience—

AUTOMATIC RAW STOCK DRYER (single and triple conveyor types) for raw cotton, wool, silk and all other fibrous or loose materials.

SKEIN YARN DRYERS (Automatic conveyor and truck types) for all kinds of yarn in skeins; tapes, etc.

PACKAGE YARN DRYER—for drying yarn in wound packages, as dyed by the Franklin Process.

AUTOMATIC PIECE GOODS DRYER—for silk piece goods, knit goods, turkish toweling, cloth, etc.

ROLLER CLOTH DRYER AND CARBONIZER CLOTH SHRINKING OUTFIT—CARPET DRYER.

Each with a proven record of satisfactory, profitable work in many mills. Every "Proctor" Dryer fully guaranteed. Send for a catalogue.

PROCTOR & SCHWARTZ, INC.
PHILADELPHIA

"Proctor" DRYERS

Sustained Demand

is positive proof of supreme excellence. For forty-two years the demand for

TOLHURST WHIZZERS

has been supreme in centrifugal extraction. Textile Mills have continuously used them because of the consistently reliable and satisfactory service given.

Tolhurst "Self-Balancing" Whizzers are made with baskets from 12″ to 72″ and are provided with patent, adjustable idler pulleys which permit countershaft, engine or motor drive from above or below.

Our Attractive New Catalogue Will Be Sent Free Upon Request

TOLHURST MACHINE WORKS

Established 1852 **Troy, N. Y.**

New York Office: 111 Broadway

SOUTHERN REP.: Fred H. White, Realty Bldg., Charlotte, N. C.

WESTERN REP.: John S. Gage, Hartford Bldg., Chicago, Ill.

SAN FRANCISCO REP.: B. M. Pilhashy, Merchants Exchange Bldg. San Francisco, Cal.

CANADIAN REP.: W. J. Westaway Co., Main & McNab Sts., Hamilton, Ont.; 400 McGill Bldg., Montreal.

Borromite
Softened Water
In Any Mill

Decreases operating costs.
Speeds up production.

Insures maximum saleability of textile products because of their uniform beauty.

Send for our Circular.

Borromite Company of America

Members of Associated Manufacturers of Water Purifying Equipment

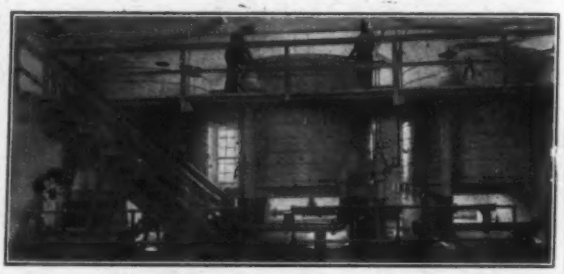
1516-105 West Monroe St. CHICAGO

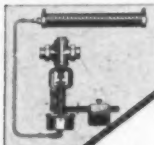
REG. U. S. PATENT OFFICE

DECALSO
WATER SOFTENER

You know the necessity of perfectly soft water in your processes, and what it saves you in soaps, chemicals, dyestuffs and labor—how it makes the production of better goods possible. You know that a good water softener will be an investment, not an expense. The question is, which softener will be best? "DECALSO" Water Softeners are proving to be the most scientific and efficient softening apparatus on the market. Regeneration does not require long delays. They are always dependable. Let us tell you the whole story. Write today for booklet.

AMERICAN WATER SOFTENER CO.,
The Oldest Water Softener Manufacturer in the Country
Lehigh Ave. & 4th St. Philadelphia, Pa.





Insures
Proper Dyeing

POWERS Automatic Thermostatic Regulators control the temperature with scientific exactness. The sensitive thermostat bulb responds to the slightest variation of temperaure, keeping it always constant.

POWERS Regulators are easily installed and adjusted. They watch the heat *a l l* the time and enable your operators to devote themselves entirely to productive work.

The Powers Regulator Co.

New York Boston Chicago Toronto

Southern Representatives

Ira L. Griffin, Greenville, S. C.
Guy L. Morrison, Charlotte, N. C.

(1445 B)

"BRETON"
MINEROL "F"

For
Cotton Print Goods

"It prevents foaming in the color box"

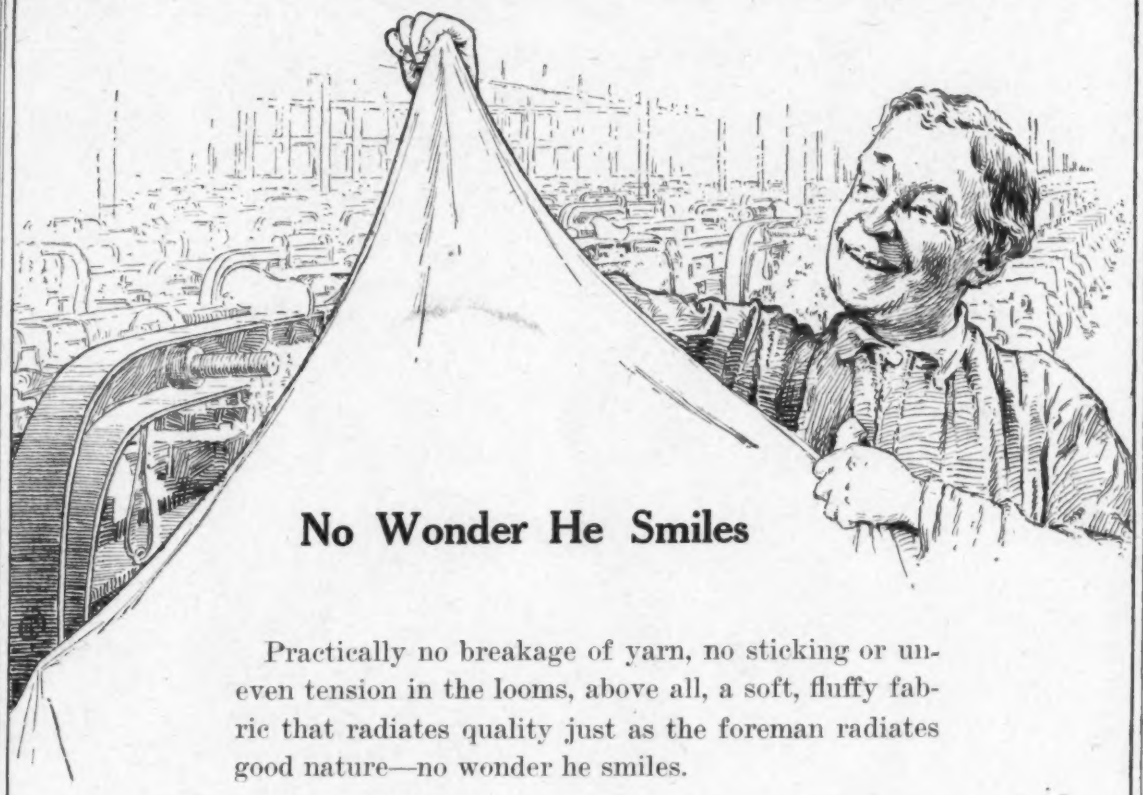
BORNE, SCRYMSER CO.,

Established 1874

80 South Street, NEW YORK

BOSTON PHILADELPHIA

Works: Elizabethport, N. J.



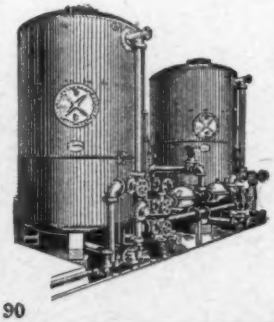
No Wonder He Smiles

Practically no breakage of yarn, no sticking or uneven tension in the looms, above all, a soft, fluffy fabric that radiates quality just as the foreman radiates good nature—no wonder he smiles.

A Permutit Water Softener brought about this result.

By removing all hardness and all harmful mineral impurities from the water, it has enabled this mill to produce, with economy and absolute dependability, a quality and texture of fabric never before achieved. It has eliminated absolutely all scale from boilers and kiers, and it has saved one shovel full of coal out of every four, besides soaps and supplies in profitable quantities.

Hundreds of mills are profiting by the economies and improvements from their Permutit Equipment. Let us solve your problems too—no cost, no obligation—write today.



The Permutit Company
440 Fourth Ave. New York
Offices in all principal cities

90

ZAVON

The Super Solvent

The manufacture of ZAVON, the well known textile solvent has been taken over by a new company and extensive factories have been put in operation at Danbury, Conn.

Here in the new factories ZAVON will be manufactured on an extensive scale to supply the textile industry with this superior solvent.

In the kier, the open kettle, or for all softening purposes, ZAVON is superior to soaps and soluble oils.

Send for working samples of **ZAVON** and learn the advantages of this effective solvent.

ZAVON COMPANY
Incorporated

60 Broadway
New York City

The Result of Continuous Care

"One hundred ninety-one firms reported a total of 24,736 employees engaged in the manufacture of coal-tar products, 2,605, or 10.5 percent. were chemists or engineers. This is probably a larger proportion of technically trained men than will be found in any other important manufacturing industry in the U. S."—*United States Tariff Commission Report.*

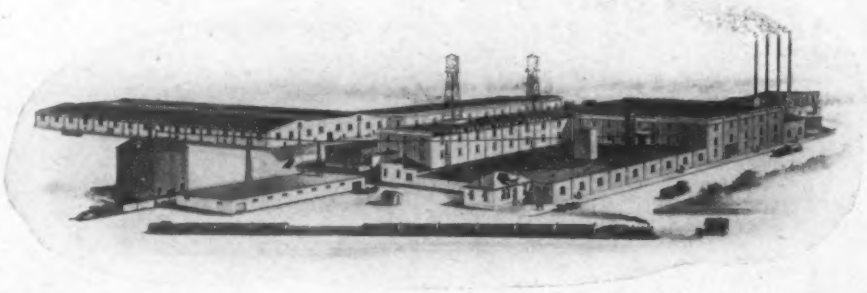
The reason for this preponderance of technicians is that each step in the intricate synthesis from the lump of coal to the brilliant dyestuffs must be under the constant observation of chemical engineers.

Coal-tar dyestuffs are the final effect of months of tedious laboratory research coupled with more months of semi-commercial experimenting and the last stage of actual plant production. Each step has its ever-watchful chemist, for the greater the care the better the dyestuff.

Du Pont Dyestuffs are what they are, because some 4000 earnest workers labor for their excellence, and of this number 470 are chemists or technically trained men.

E. I. du Pont de Nemours & Co., Inc.
Dyestuffs Sales Department
WILMINGTON, DEL.

Branch Offices
New York Boston Providence
Philadelphia Chicago
Charlotte, N. C.



VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southren Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

A GOOD BUY

You are today more interested in making a good buy than you have been at any time during the past five years. And for these same reasons the qualities which characterize the use of

Wyandotte Textile Soda
Wyandotte Concentrated Ash
Wyandotte Kier Boiling Soda

warrant your thoughtful consideration. They are unusual alkali products, unusual in that they produce results that give distinction to your output and do it, too, without added costs or novel operations.

If these products were new and merely laboratory tested you might, and justly so, withhold consideration until such a time as their practical worth had been established. But while these Wyandotte special alkalies may be new to you, the desirable results which follow their use are not new to many others with problems similar to your own.

They are good buys. And with this guarantee, your thoughtful attention is solicited.

Order from your supply house

or

Write us for further information.

THE J. B. FORD CO. Sole Mnfrs.,
WYANDOTTE, MICH.

ESTABLISHED 1815

Arnold Hoffman & Co., Inc.,

PROVIDENCE, R. I. NEW YORK, N. Y.
BOSTON, MASS. PHILADELPHIA, PA.
CHARLOTTE, N. C.

Importers and Manufacturers of

STARCHES, GUMS, DEXTRINE, ALIZARINE ASSISTANT, SOLUBLE OIL, SOAP

And Every Known Material from Every Part of the World for Starching, Softening, Weighting and Finishing Yarn, Thread or any Fabric.

Special Attention Given by Practical Men to Specialties for

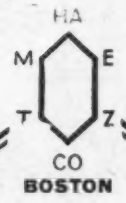
SIZING, SOFTENING, FINISHING AND WEIGHTING

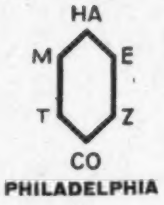
Cotton, Woolen and Worsted Fabrics combining the latest European and American Methods. We Believe There is No Problem in

SIZING OR FINISHING

That We Cannot Solve.

FORMULAS for the best method of obtaining any DESIRED FINISH on any fabric cheerfully given.





Aside from the line of Dyestuffs, Intermediates, Cotton Finishes, Turkey Red Oils, Soluble Oils and Leather Oils made in the U. S. by

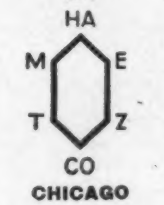
Consolidated Color & Chemical Co.

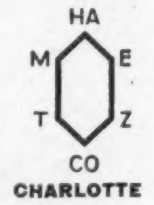
and

Central Dyestuff & Chemical Co.

ALGOL
HYDRON
HELINDON
THIO-INDIGO

vat colors will be procured for you on Import Licenses that may be granted you by the War Trade Board, or such of these colors as are available and made by the Farbwerke - Hoechst, Farbenfabriken vorm. Fried. Bayer & Co., Leverkusen, Leopold Casella & Co., Frankfurt, Kalle & Co., Bieberich, and Griesheim-Electron (Oehler) of Frankfurt. Licenses are granted for colors not made in the United States or not made in sufficient quantities or at reasonable prices. All products brought over on Licenses will be obtained by us at the lowest prices quoted for export to any one or any Government by the manufacturers.



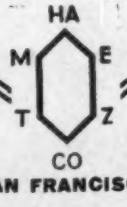


A new color card of American made colors on cotton yarn is being distributed. Have you received your copy?

H. A. METZ & CO. Inc.

One-Twenty-Two Hudson Street, New York City.

Boston Philadelphia Providence Chicago Charlotte San Francisco



IMPROVE YOUR BLACK

"DEVELOPENE"

Turns a *Rusty Black* to a *Lustrous One.*

THERE is no slight of hand connected with it. Send a pair of stockings, a skein of yarn or a sample of fabric, which has been dyed black, washed but not finished, to our Laboratory.

We will finish it with "Developene" and return to you. There will be such an improvement you will immediately want "Developene" for finishing your goods.

MANUFACTURED ONLY BY

Kali Manufacturing Co.

MANUFACTURING CHEMISTS

1404-1410 N. Front Street **PHILADELPHIA, PA.** 1409-1413 N. Hope Street

Salicylic Acid Prevents Fermentation of Size

Sole Manufacturers of Hydroxy Oil and Kali Chlorine Neutralizer—the Superior Anti-Chlor. Formaldehyde.

JACQUES WOLF & CO.

Manufacturing Chemists & Importers

MAIN OFFICE and WORKS: PASSAIC, N. J.

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HYDROSULPHITES

For All Purposes

All Sizing and Finishing Products for Cotton

Bensapol
Bleaching Oil
Cream Softener
Glasgow Sizing
Levuline
Soluble Oils
White Finish

MONOPOLE OIL

Reg. Trade Mark No. 70991

FUNCTIONING

As usual—

By operating our plants as our business requires—

By keeping our sales and manufacturing forces intact—

By filling our customers' orders as they come to us—

By not sacrificing at ridiculous prices our own products.

Incidentally our January sales of dyestuffs and intermediates were 76% above our December, 1920, sales.

Atlantic Dyestuff Company

WORKS: PORTSMOUTH and BURRAGE

MAIN OFFICE, BOSTON

NEW YORK PHILADELPHIA CHARLOTTE

CHICAGO PROVIDENCE

Starch

EAGLE FINISHING

400 MILL 500 MILL

C. P. SPECIAL FAMOUS N

BLUE RIVER CRYSTAL

These STARCHES are manufactured by carefully controlled and standardized methods.

PURITY and UNIFORMITY are secured by accurate laboratory tests.

ECONOMY and EFFICIENCY are proven by the constantly increasing number of exacting cotton manufacturers who are getting satisfactory results by using our STARCHES especially selected for their conditions.

Recommendations are based upon intelligent investigation of each individual problem.

Corn Products Refining Co.

New York

Southern Office *Greenville, S. C.*

Starch

Mercerizing Gassing Bleaching

We have a new and strictly modern plant for mercerizing, gassing and bleaching.

Located as we are in the center of the combed yarn spinning industry of the South, we are enabled to furnish you with the highest quality processed yarns in all numbers.

The American Processing Company

Mount Holly, N. C.

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New York City.

SELLING AGENTS,
THE RIDDLE COMPANY,
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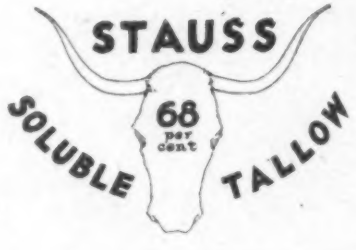
Philadelphia.



Stauss 68% Soluble Tallow and Gum—Soluble Oils

for all warp sizing and finishing purposes.

None better.

Manufactured by Geo. P. Stauss,

Importers and Distributors of

Starches, Softeners, Weighting Compounds

Write, phone or wire

Southern Distributing Company

Manuel Faulkner, Sales Mgr.

50 Market St., Phone 3439 Charleston, S. C.

SURPASS CHEMICAL CO. INC. USE OF AUTOGYP PROCESS OF DYEING. AUTOGYP PATENTED IN U.S.A. SEPT. 16, 1919. IN CANADA OCT. 10, 1919. ALBANY, N.Y.

Bleaching **Dyeing**

YOU SAVE

- **30% of Labor**
- **90% of Water**
- **50% of Steam**
- **25% of Tensile Strength**
- **3½% of Shrinkage**
- **4 to 17 Hours Time.**

Forget about the bleaching process. Use the AUTO-GYP Process of Dyeing which not only simultaneously dyes to shade and eliminates all specks, motes, leaf and shives, but makes great savings—see figures above.

These figures are not guesses, but results from tctual tests. They will at once be recognized by any practical mill man who instead of bleaching cotton and cotton goods preliminary to dyeing uses the AUTO-GYP PROCESS which in addition to dyeing, removes all specks, motes, shives, etc., in one bath.

If such economies interest you, let us prove them by actual demonstration with your own goods and your own equipment. Write for complete information today.

SURPASS CHEMICAL CO., Albany, N. Y.

AUTO GYP
Process of Dyeing

PERKINS GUARANTEED ROLLS

"Resistant but Resilient"

TRADE MARK

COTTON — PAPER — HUSK — COMBINATION

B. F. PERKINS & SON, Inc.
HOLYOKE, MASS.

Soluble Grease

To make the stock yarn or warps Run Smooth, regardless of dyes that make the Cotton Fibre harsh.

BOSSON & LANE
ATLANTIC MASS.

AKO AKO AKO

HEADQUARTERS OF RAW MATERIALS for the TEXTILE INDUSTRY

Carbonate of Soda	Caustic Potash
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Olive Oil Commercial
Imported Zinc Oxide

Inquiries Solicited

A. KLIPSTEIN & CO.
644 Greenwich Street, New York City

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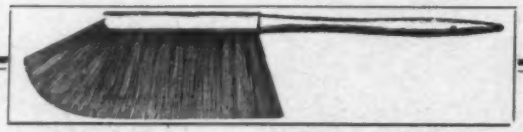
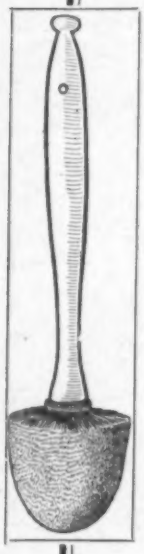


PROPER BRUSHES



Have proven their worth as time and money savers many times. Unless a man is a "FELCO" user when he adds up his annual expenditure for mill brushes and floor sweepers he usually changes his buying methods that very day.

A SURE SIGN OF FELCO A GOOD BRUSH

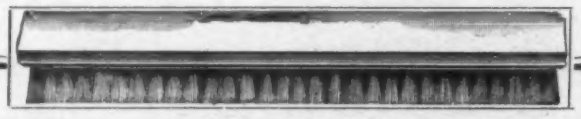
It's the bristle that determines the value of a brush. "Felco" bristles are selected by experts of many years' training, experience, and experiment.

Have you our catalog?

DISTRIBUTORS OF GARVEY STENCIL AND MARKING INK
A non-evaporating waterproof Marking Ink which is impossible to rub off

ATLANTA BRUSH COMPANY

CENTRAL & TRINITY AVES. ATLANTA, GA.



GREENVILLE

Spools That Satisfy

Let us submit prices and samples on WARPER and TWISTER SPOOLS. Plain wooden head and metal shield. A list of Southern mills using Greenville Spools given on request.

GREENVILLE SPOOL & MFG. COMPANY
Greenville, S. C.

SPOOLS

AMERICAN SUPPLY COMPANY

PROVIDENCE, R. I.

MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping
Etc.

We make a specialty of Harness for Warp Drawing Machines

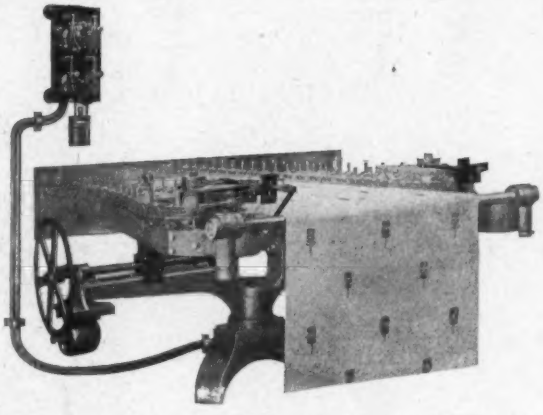
NOTE—No orders too large for our capacity.
None too small to receive careful attention.

DECREASE COSTS

by installing

THE SCHWARTZ AUTOMATIC ELECTRIC GUIDER

PATENTED



Used on all kinds and weights of cloth.

Write us for further information.

Manufactured and Distributed by

BLAKE ELECTRIC MFG. COMPANY,

1 ROWES WHARF, BOSTON, MASS.

Southern Representative: GREER & CO., GREENVILLE, S. C.

FIG.20.

All our baskets made from Lane Duck from our own weaving. Unusually high tensile strength and wearing qualities are obtained by use of strictly long staple cotton and approved modern methods of manufacture.

USE

LANE CANVAS BASKETS

Their long life makes them an investment.

FIG.27

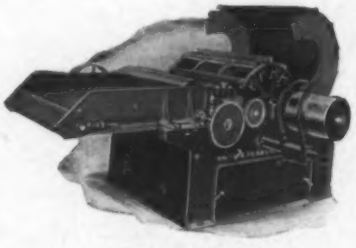
This truck embodies all the advantages of Lane Baskets, plus our specially designed Thread guard Casters, which are IN FACT, NON-CLOGGING. Furnished in either stationary or swivel frame style, of generous diameter and tread.

Write for Catalog No. 75.

W. T. LANE & BROTHER, Manufacturers Poughkeepsie, N. Y.

SMITH & FURBUSH
MACHINE CO.
PHILADELPHIA, PENNA.

Specialists in machinery for working all kinds of Waste Products. Complete equipment for coarse yarns, etc., from waste. Shoddy, Felting and Woolen machinery.



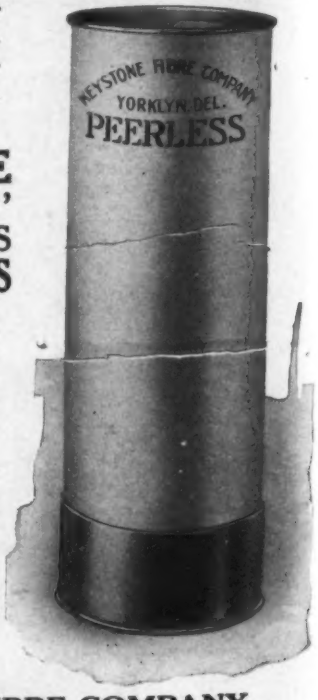
Jute Picker
Send for Circular S-166

This machine is used for shredding or hackling out Gunny and Burlap bagging.

It is used as a part of our outfit for the manufacture of gunny sacking from scrap bagging.

They pay greater profit on your investment in longer life and higher efficiency.

KEYSTONE "PEERLESS" SEAMLESS ROVING CANS



They are made of the lightest, strongest fibre with a specially reinforced bottom.

Send for our booklet showing full line of durable Keystone Holloware for mills.

Orders filled through any responsible mill supply house, or direct.

KEYSTONE FIBRE COMPANY
Box 243, Yorklyn, Delaware
Southern Representatives: The Wilson Company, 408-409 News Bldg. Greenville, S. C. Philadelphia Office: 504 North American Street
Boston Office: 136 Federal Street

A Vigilant Watchman

is the best protection against fire, theft or malicious destruction.

ECO
Portable Watchman's Clocks

will keep your watchmen vigilant. They defy tampering without detection.

For information write to

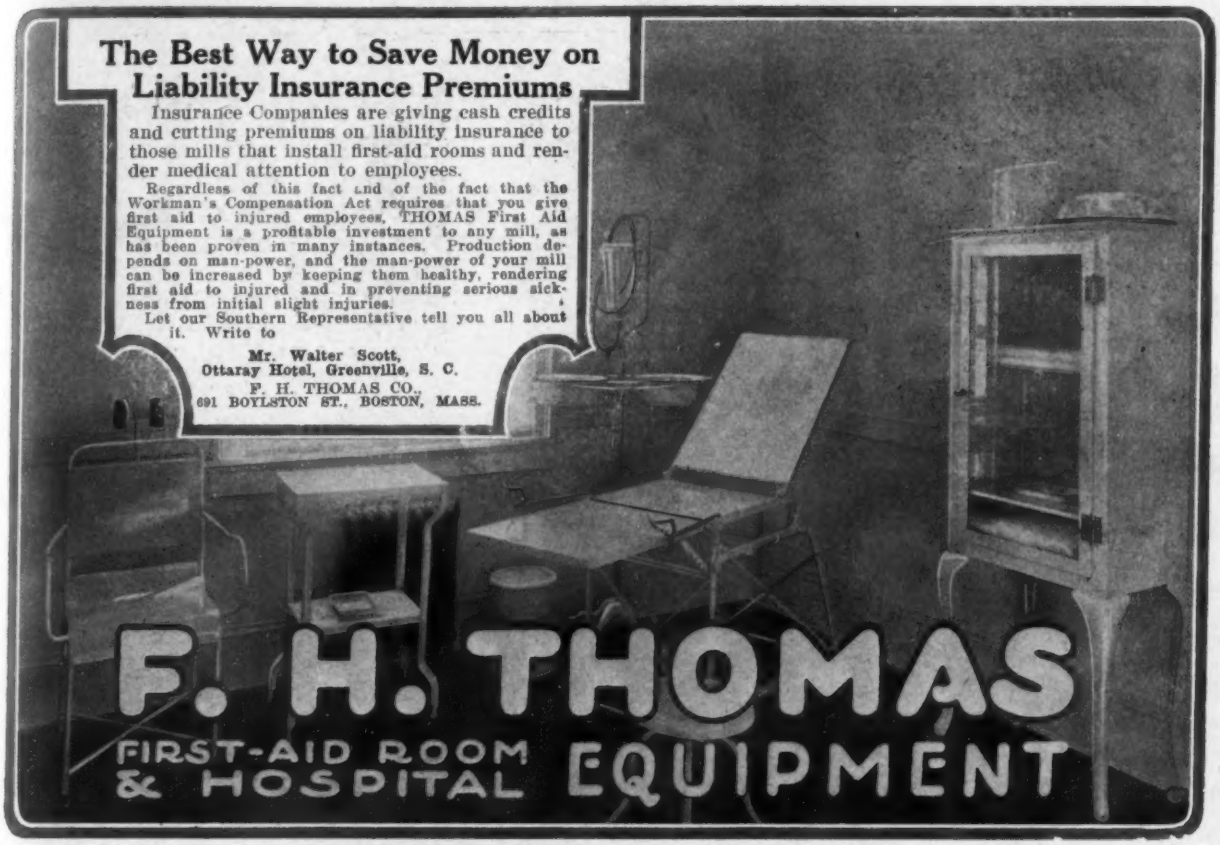
ECO CLOCK COMPANY
196 Congress St., Boston, Mass.
24 Cortlandt St., New York
Southern Department: 23 Walton Bldg., Atlanta, Ga.

TEN YEARS or more with the same loom-harness when you weave with

"DUPLEX" FLAT STEEL LOOM HARNESS

Let us quote you

STEEL HEDDLE MFG. CO.
GREENVILLE PHILADELPHIA PROVIDENCE
Southern Office
111 Washington St. Greenville, S. C.
Hampton Smith, Southern Manager.


The Best Way to Save Money on Liability Insurance Premiums
Insurance Companies are giving cash credits and cutting premiums on liability insurance to those mills that install first-aid rooms and render medical attention to employees.
Regardless of this fact and of the fact that the Workman's Compensation Act requires that you give first aid to injured employees, THOMAS First Aid Equipment is a profitable investment to any mill, as has been proven in many instances. Production depends on man-power, and the man-power of your mill can be increased by keeping them healthy, rendering first aid to injured and in preventing serious sickness from initial slight injuries.
Let our Southern Representative tell you all about it. Write to
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Ottaray Hotel, Greenville, S. C.
F. H. THOMAS CO.,
691 BOYLSTON ST., BOSTON, MASS.
F. H. THOMAS
FIRST-AID ROOM & HOSPITAL EQUIPMENT

SPINNING RING SPECIALISTS SINCE 1873
SPINNING RINGS
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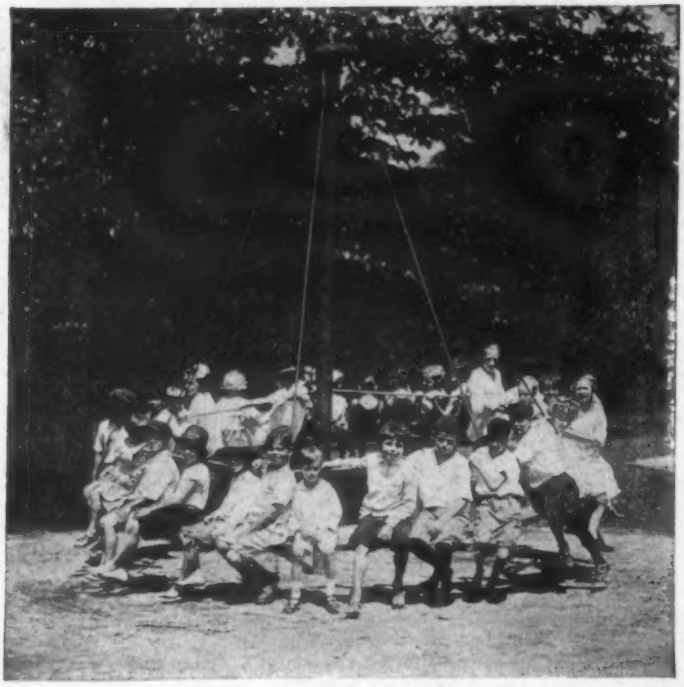

"FUN-FUL" OCEAN WAVE. IN USE IN WASHINGTON PARK, CHICAGO. NOTE THE CAPACITY OF IT.

BE SURE

YOUR PLAYGROUND SPECIFICATIONS INCLUDE

THE FUN-FUL LINE
PLAYGROUND EQUIPMENT

THE LAST WORD IN IMPROVED PLAYGROUND EQUIPMENT.

BUY *NOW*, and be assured of prompt delivery. Installation can be made now, avoiding early spring rush and attendant delays.

We have

"Everything for the Playground"

including

Slides, Swings, Giant Strides, Ocean Waves, Gymnasium Combinations, See-Saws, etc., etc.

Write for Catalog.

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ANDERSON,
INDIANA.

HILL-STANDARD CO.

Factories:
ANDERSON, IND.
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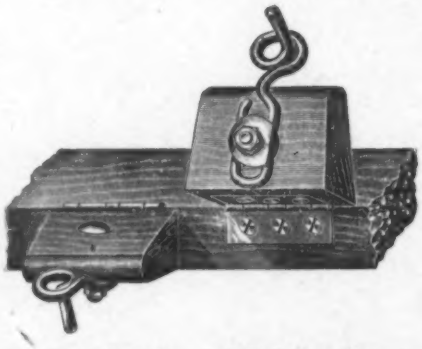
The Palmer Adjustible Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

The Petit Grand is Indispensable to the Correctly Furnished Home

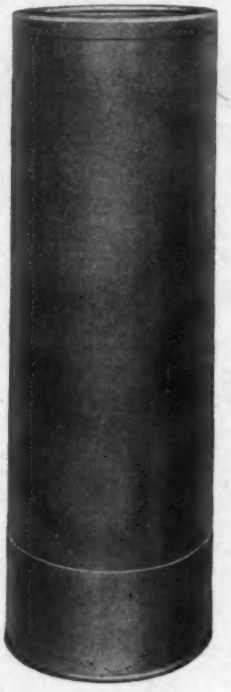
—From the musical standpoint—

The supremacy of the Grand Piano is conceded by all musicians. It is acknowledged to contain the most scientifically correct scale, action and touch that human skill has attained in generations.

The STIEFF PETIT GRAND is recognized by the foremost artists of interior decoration as the richest, most exquisite of furnishings, lending an air of rare charm and grace so desired in the correctly furnished interior. Write for booklet and prices.

CHAS. M. STIEFF, Inc.

M. D. MANNING, Mgr. CHARLOTTE, N. C.



Diamond F Seamless Roving Cans

100% service can be obtained by installing Diamond F Roving Cans.

Attractive, strong, durable, free from burrs or other rough spots that catch the stock.

We also make a full line of other receptacles, such as trucks, sample cases, baskets, locker boxes, etc.

Send for our catalogue
"Diamond Fibre Receptacles"

Diamond-F

Dept. 8

Diamond State Fibre Company

Bridgeport (near Philadelphia), Penna.

Branch Factory and Warehouse: Chicago

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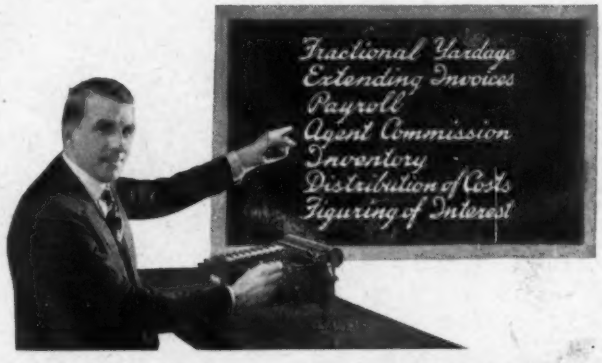

The Monroe Simplifies Textile Mill Accounting

THE simple, short-cut methods which may be applied to the Monroe Calculating Machine have enabled hundreds of textile mill accountants to handle the vast amount of involved figure-work made necessary by modern accounting systems.

The Monroe figures fractional yardages and invoice extensions. The Monroe finds the true distribution of costs to various departments. The Monroe calculates interest, chain discounts, transportation charges and payrolls. No matter what the task, the Monroe can do the work quickly, easily and accurately.

Because of its simplicity of operation, inexperienced help can use the Monroe after a few minutes' practice. You simply set the numbers on the keyboard and turn the crank—forward for addition and multiplication, backward for subtraction and division. The answer and proof appear simultaneously in the dials and on the keyboard.

A demonstrator will show you how the Monroe can save time and money on your own work in your own office. Send for him today. No obligation. Simply mail the coupon.

MONROE

Reg. U. S. Pat. Off.

Calculating Machine

The "SHOW ME" Coupon—Mail it today

Monroe Calculating Machine Co., Woolworth Bldg., New York

Without obligation, check items desired:

[ ] Send copy of "Handling Figures at Spindle Speed."

[ ] Please arrange for a demonstration in our office.

Firm Name.....

Your Name.....

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Cotton 3-21

Adjustable Steel Partitions

that protect against fire, vermin and upkeep costs.

Manufactured in units and half units. Easy to set up or take down without dirt, loss of time or expense. Easy to change to meet requirements of tenants. The building carpenter can easily make the changes.

A fire in a room otherwise fireproof with Dahlstrom Adjustable Steel Partitions to serve as walls cannot pass into corridors or other offices. Each office is virtually a unit or building by itself.

Fastened by concealed expansion bolts that will not harm, scratch or mar the floors, walls or ceilings.

Finished in plain colors or grained to perfectly match any wood finish desired. Finished by our special baked-on-enamel process.

Partition illustrated in one section of more than a mile of Dahlstrom Adjustable Steel Partition in the Guardian Savings & Trust Building, Cleveland, Ohio, erected in 1916.

Our folder "Adjustable Steel Partitions," free upon request.

Dahlstrom Metallic Door Company

409 Buffalo Street, Jamestown, N. Y.

LUKE SEAWELL, Southern Representative

Atlanta Office: 422 Austell Building. Telephone Ivy 4434.

A BIG FACTOR IN MILL CLEANLINESS

Sanitary Washbowls have become necessities in the promotion of proper working conditions for employees, wherever factory cleanliness is considered worth having. Manufacturers no longer wonder if they can afford them. Instead, they realize that doing without them is the true cause of expense. Consequently the recognized standards in scores of mills today are

MEECO SANITARY WASHBOWLS

They should be the same in yours, because the same careful workmanship and the same simple, practical design which has proven so satisfactory for others will prove equally so for you.

Meeco Washbowls come in batteries, consisting of any number you may require. The variety of ways in which they may be installed always makes possible the greatest conservation of space without a sacrifice to convenience. They are finished in baked brown enamel with nickel-plated fittings and white enamel bowls. Thoroughly built and handsome in appearance.

Write For Catalog showing our full line of Stationary Wash Bowls, Bubbling Fountains, Metal Lockers, All Steel Stools and Chairs and Inset Wood Seats, Stock and Storage Racks, Metal Shelving, Metal Vault Fixtures, Improved Soda Kettles (40 to 60-Gallon), Water Heaters and Instantaneous Mixers, Work Benches and Bench Legs, Drawing Stands, full line of Plumbing Fixtures, etc.

Manufacturing Equipment & Engineering Co.

136 Federal St., Boston, Mass.

Address all communications to Framingham, Mass.

Drinking water in winter is as necessary as in summer time, But it must be dispensed in a sanitary manner.

A PURO Cooler with its PURO, JR. Fountain will keep your employees both healthy and happy.

Start a campaign now and clean out the "old tin drinking cup."

Install a PURO Cooler and thereby increase the productiveness of your employees.

PURO SANITARY DRINKING FOUNTAIN CO.

HAYDENVILLE, MASS.

E. S. PLAYER, Southern Sales Mgr.,

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QUICKOOL

The Drinking Fountain

That *is* Sanitary.

IF there's anything your employees appreciate in warm weather, it is plenty of pure cold drinking water. And the fountain that is really sanitary and that cools the water quickly and inexpensively is the QUICKOOL with the patented

Protectajet Bubbler

This is an umbrella-shaped protector which operates automatically to keep the jet covered when the water is not running. It prevents water from falling back on the jet, and keeps drinkers' lips, germ-laden dust and mouth secretions from touching the jet.

The water is cooled in a cast iron jacket at bottom; there are no coils. Ice does not touch the water. The cork insulated refrigerator a 75-lb. cake of ice—100 lbs. cracked. It connects to regular supply and waste lines, the waste being trapped to keep the warm air from backing up into it. The stop cock at the jet is self-closing.

Write for prices and further information about the QUICKOOL

The CENTRAL BRASS MFG. CO. of CLEVELAND

Indianapolis Bleaching Co., Indianapolis, Ind.

Beautiful Lawns Are Always Well Rolled.

The leading authorities on lawn care agree that plenty of rolling is of vital importance to any well kept lawn. In the early spring rolling is especially important because the sod should be well packed down to protect the roots of the grass.

It is also advisable to roll the sod every time the grass is cut. This keeps the sod smooth and firm, and discourages the invasion of ants, worms, grubs, moles and other lawn pests.

As a consequence, many people who procure an Ideal Power Lawn Mower primarily for cutting their grass, find that the rolling feature is equally important, and practically doubles the usefulness of the machine.

For the Ideal is a **power mower** and **power roller** in one. Besides doing as much and better work than five men with hand mowers it keeps the sod well rolled at all times. When used for rolling only the cutting unit is lifted from the ground by means of a convenient and easily operated lever.

Ideal Power Lawn Mowers are used on private estates, municipal parks, cemeteries, golf courses, college grounds, ball parks, school grounds, hospital grounds etc. Here are just a few names from the thousands of Ideal users: Edsel Ford, Detroit; Lehigh University, Bethlehem, Pa.; H. H. Timken, Canton, Ohio; Bausch & Lomb Optical Co., Rochester; Geo. W. Perkins, Riverdale, N. Y.; C. T. Crumley, Denver, Colo.

With riding trailer the Ideal makes the most practical and economical power mower possible to procure. Furnished with or without riding trailer.

Special cutting unit for putting greens can be furnished for golf course work. Any of our dealers will gladly demonstrate the Ideal for you. Special illustrated catalog upon request.

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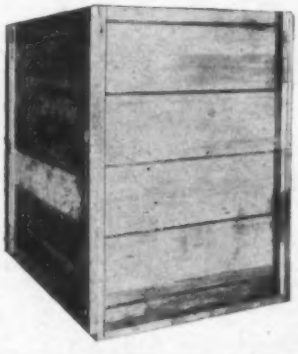
DEALERS IN PRINCIPAL CITIES.

Fay School, Southboro, Mass.

IDEAL POWER LAWN MOWER

THIS
CONVINCING COMPARISON
SHOWS THE SUPERIORITY OF
SIGNODE SYSTEM
OVER THE USUAL BALE TIE.
LET US SEND YOU FULL DETAILS
SIGNODE SYSTEM, INC.
CHICAGO ATLANTA
Boston New York Philadelphia San Francisco Toronto

$\frac{5}{8}$" x .015 SIGNODE TIE	COSTS 12 % LESS PER FOOT	HOLDS UNDER 800 LBS. PULL	NO "SPIDER" TO INJURE HANDS
Compared with			
USUAL $\frac{5}{8}$" x .017 BALE TIE	COSTS 12 % MORE PER FOOT	BREAKS UNDER 500 LBS. PULL	DANGEROUS "SPIDER" OFTEN PRESENT



Cypress Tanks
Wooden Packing Cases
ALL STYLES
Manufactured from
GEORGIA PINE POPLAR CYPRESS
WHITE PINE and GUM
Your Inquiry Solicited
Hightower Box & Tank Co.
Corner Humphreys and Glenn Streets,
BOX 1025 ATLANTA, GA.

Lips Cannot Touch the NOZZLE

Reports of medical experts made in one of the leading Universities of this country said:

"Why retain a vertical column of water when it is obviously the upward direction of flow which more than any other factor renders the bubbling fountain unsafe?"

With **THE VERTICO-SLANT** Stream Fountain, the copious drinking feature of the vertical stream is retained as the mouth comes in contact with the stream at a point where it loses its momentum.

Lips cannot touch the nozzle, which is raised slightly above the sloping base of recess.

A glass or cup can be as readily filled from this stream as from a faucet

Write for circular giving greater details.

RUNDLE-SPENCE MFG. COMPANY,
MILWAUKEE, WISCONSIN.

R-S VERTICO - SLANT STREAM FOUNTAINS

VOGEL
PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

No. 1

- Enameled roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat. Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE

ALL OVER The South

THEY ARE SPECIFYING

DOUBLE REGNAS DIAMOND

TRUCKS

Fig. 200
GENERAL DUTY TRUCK
Size 27 x 48 Capacity 1500 lbs.

Over 300 Styles

A Truck for Every Purpose

SPECIAL TRUCKS TO ORDER

Prompt shipment on all standard sizes and styles of Hand Trucks and Platform Trucks.

J. R. Regnas & Co.

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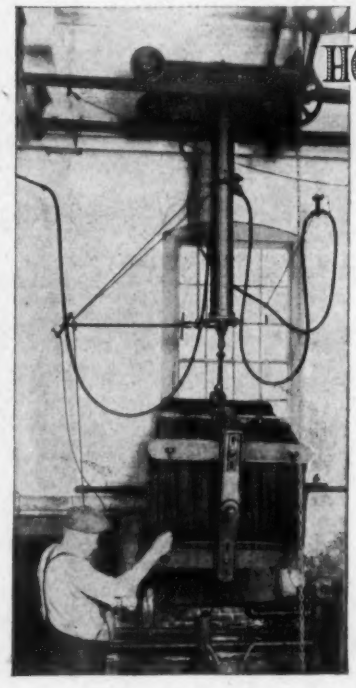
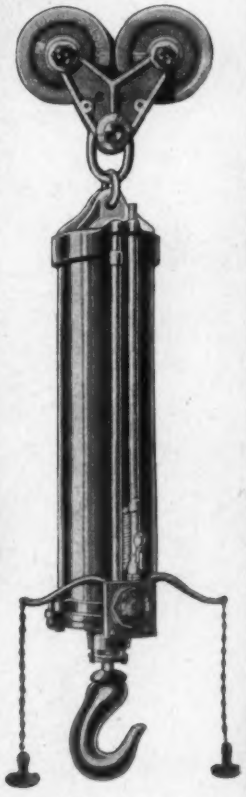
ATLANTA : : GEORGIA

CURTIS AIR HOISTS





Used In The Textile Industry

"Lift it with air"

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are affecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available. The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

Curtis Pneumatic Machinery Co.

1571 Kienlin Ave. St. Louis, Mo.

Branch Office

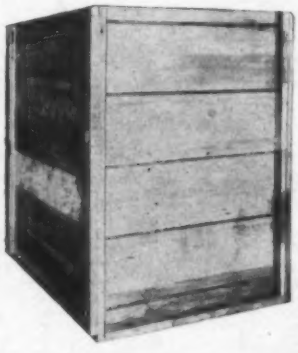
532-R Hudson Terminal New York

CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS
© C.P.M.C.Co.

Established 1854

THIS
CONVINCING COMPARISON
SHOWS THE SUPERIORITY OF
SIGNODE SYSTEM
OVER THE USUAL BALE TIE.
LET US SEND YOU FULL DETAILS
SIGNODE SYSTEM, INC.
CHICAGO ATLANTA
Boston New York Philadelphia San Francisco Toronto

5/8" x .015 SIGNODE TIE	COSTS 12 % LESS PER FOOT	HOLDS UNDER 800 LBS. PULL	NO "SPIDER" TO INJURE HANDS
Compared with			
USUAL 5/8" x .017 BALE TIE	COSTS 12 % MORE PER FOOT	BREAKS UNDER 500 LBS. PULL	DANGEROUS "SPIDER" OFTEN PRESENT



Cypress Tanks
Wooden Packing Cases
ALL STYLES
Manufactured from
GEORGIA PINE POPLAR CYPRESS
WHITE PINE and GUM
Your Inquiry Solicited
Hightower Box & Tank Co.
Corner Humphreys and Glenn Streets,
BOX 1025 ATLANTA, GA.

Lips Cannot Touch the NOZZLE

Reports of medical experts made in one of the leading Universities of this country said:
"Why retain a vertical column of water when it is obviously the upward direction of flow which more than any other factor renders the bubbling fountain unsafe?"
With **THE VERTICO-SLANT** Stream Fountain, the copious drinking feature of the vertical stream is retained as the mouth comes in contact with the stream at a point where it loses its momentum.
Lips cannot touch the nozzle, which is raised slightly above the sloping base of recess.
A glass or cup can be as readily filled from this stream as from a faucet
Write for circular giving greater details.
RUNDLE-SPENCE MFG. COMPANY,
MILWAUKEE, WISCONSIN.

R-S VERTICO - SLANT STREAM FOUNTAINS

VOGEL
PATENTED

Frost Proof Closets
350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.
No. 1
Enameled roll flushing rim bowls.
Heavy brass valves.
Strong hardwood seat. Galvanized tank.
Malleable seat castings will not break.
Tested under hydraulic pressure before leaving factory.
ASK YOUR JOBBER
JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE

ALL OVER The South

THEY ARE SPECIFYING

DOUBLE REGNAS DIAMOND

TRUCKS

Fig. 200
GENERAL DUTY TRUCK
Size 27 x 48 Capacity 1500 lbs.

Over 300 Styles

A Truck for Every Purpose

SPECIAL TRUCKS TO ORDER

Prompt shipment on all standard sizes and styles of Hand Trucks and Platform Trucks.

J. R. Regnas & Co.

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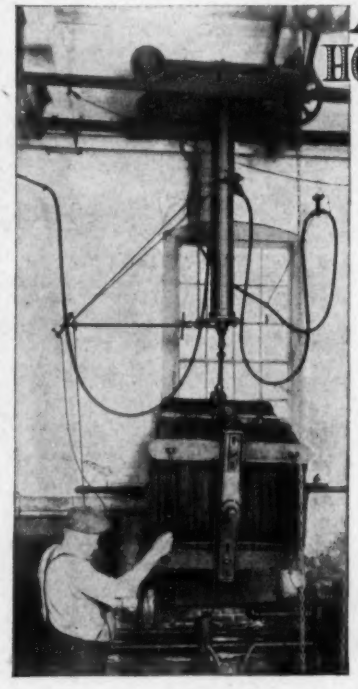
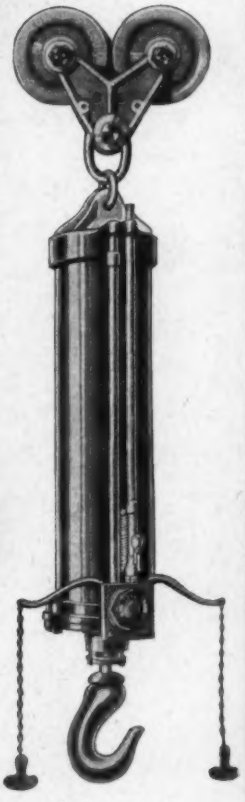
ATLANTA : : GEORGIA

CURTIS AIR HOISTS





Used In The Textile Industry

"Lift it with air"

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are affecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available. The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

Curtis Pneumatic Machinery Co.

1571 Kienlin Ave. St. Louis, Mo.

Branch Office

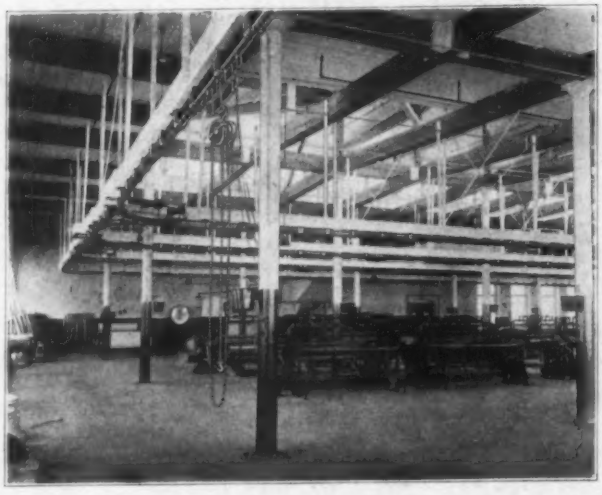
532-R Hudson Terminal New York

CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS
© C.P.M.C.Co.

Established 1854

OVER-WAY

Carrying Equipment



Our new "OveR-Way" catalog is now ready for distribution. Write for your copy—learn how you can reduce time and labor charges for moving heavy loads. One plant above, using "OveR-Way" found that one man could do the work of twelve in one-tenth the time.

Ask for special catalog G-A23

Richards-Wilcox Mfg. Co.
A Handy Door for Any Door That Slides
CHICAGO ST. LOUIS LOS ANGELES PHILADELPHIA
AURORA, ILLINOIS, U.S.A.
CLEVELAND — INDIANAPOLIS — LONDON, ONT.
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Are Sales Off?

Are you storing your finished product ready to make "Immediate Delivery?"

J. D. COLLINS
STORAGE EQUIPMENT
926 GRANT BLDG.,
ATLANTA, GA.

has the equipment that will reduce your storage and handling expenses. Tiering machines, Electric and hand trucks, Gravity and Power Conveyors of all kinds.

Catalogs and full information furnished upon request.

Immediate Shipments Lower Prices

Buy from our Charlotte Branch

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C-H Perma-White Mill Gloss
C-H Bungalow Shingle Stains
C-H House Paint
C-H Eggshell Wall Paint

GLASS
Window Glass
Ribbed Glass
Figured Glass
Plate Glass

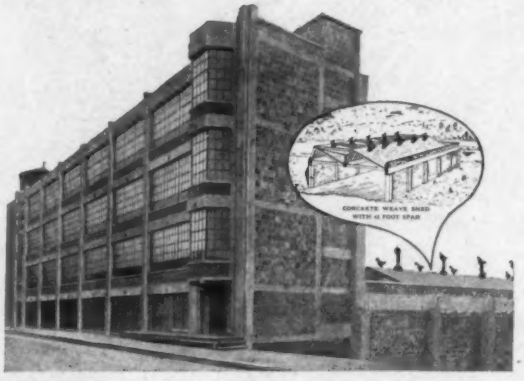
In order to increase our facilities for serving the Textile Mills we have established a branch at Charlotte which will carry in stock a complete line of mill whites and house paints, as well as plate, window and building glass of every description.

We can make **immediate delivery** from our Charlotte Warehouse. You will find our prices considerably lower.

Ask us for estimates on paints, glass, lead and oils

F. J. COOLEDGE & SONS
CHARLOTTE
ATLANTA SAVANNAH

COOLEDGE CH HYGRADE
Paints and Varnishes



Factory, and Weave Shed with 42-foot Span, Concrete Saw-tooth Roof. Designed and constructed for Sidney Blumenthal & Co., Inc., at Shelton, Conn.

Expect the Utmost

THE Thompson & Binger organization is not new, nor old; not small, nor large. It is old enough to have acquired reputation, altho this reputation is not of such long standing that it need not be lived up to; its personnel is far too large to be designated small, but not so large that one of the two principals does not know the status of your job, every day.

You, as a client of Thompson & Binger, Inc., should expect the utmost in design and construction.

THE ENDICOTT-JOHNSON WORKERS have chosen us to do the designing, engineering, and construction of all concrete buildings to be erected by them.

THOMPSON & BINGER
INC.
ENGINEERS & CONTRACTORS
CONSULTATION - DESIGN - CONSTRUCTION

NEW YORK
280 MADISON AVE.

SYRACUSE
GURNEY BUILDING

CONCRETE

Your plant is worth --?

THERE is a potent reason for the many plant appraisals that have been made recently.

The present commercial era is one of change and uncertainty. Tumbling prices, difficult wage adjustments, unstable markets, these and other infirmities obscure the true condition of industry. And it is proportionately difficult to determine the present worth and future possibilities of the individual plant.

Appraisals made but a few years ago are misleading now—they will be more so in the near future. An appraisal made today should include not only an accurate valuation of buildings, machinery and equipment, but also a dependable estimate of the development of the plant and the industry at large.

The industrial valuation service of Lockwood, Greene & Co., combining the opinion of experienced engineers and owners of industrial plants, is especially adapted to the present peculiar business conditions. It considers such important questions as labor and transportation conditions, present and future value of patents, a study of processes and marketing capacity and the value of the component parts of the plant for their intended purpose.

This comprehensive, dependable service is available to every manufacturer, regardless of location, for each of our offices has facilities to make a thorough valuation of your plant.

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BUILDING WITH FORESIGHT

LOCKWOOD, GREENE & CO.
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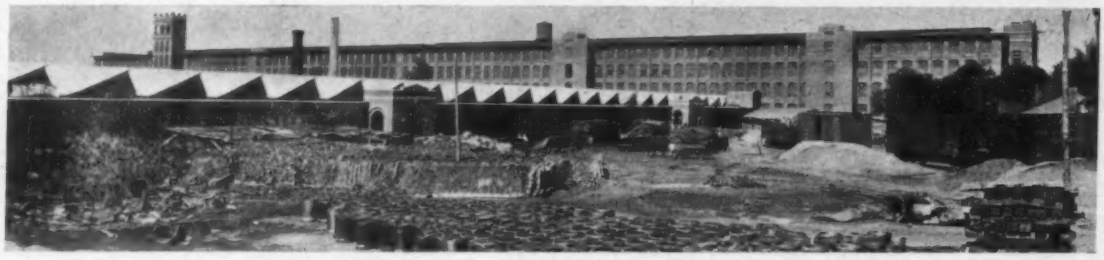
COMPAGNIE LOCKWOOD GREENE, PARIS, FRANCE



Immense mill extension and new weave shed built during 1919 and 1920 for the Bibb Mnfg. Co. of Columbus, Ga. Roberts & Co., Architects, Atlanta, Ga.; T. C. Thompson & Bros., Contractors, Charlotte, N. C.

"ENSLEY" & "ALA. CITY"

BASIC SLAG

CRUSHED AND SCREENED

is invariably specified as "the mineral aggregate" in fireproof reinforced concrete Mill buildings.

BIRMINGHAM SLAG COMPANY

Two Plants:
ENSLEY, ALA.
ALABAMA CITY, ALA.

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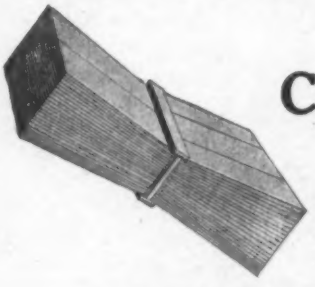
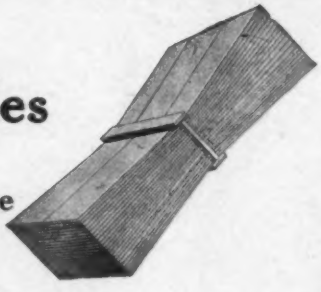
Branch Sales Offices:
ATLANTA, GA.
THOMASVILLE, GA.

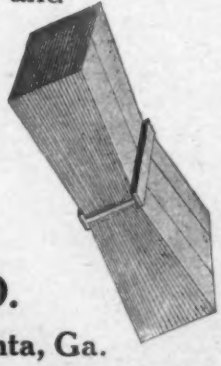




"Never-Rot" Creosoted Pine Shingles

Give Longer Life at Less Expense Than the Highest Price Untreated Shingles

Our "NEVER-ROT" creosoted pine shingles are thoroughly impregnated with pure refined creosote by our special Hot and Cold treatment, which prevents their decay, and by its waterproofing action lessens warping and shrinking.



Reduce Your Annual Roofing Costs 60% by the use of "Never-Rot" Creosoted Pine Shingles

Write us for carload prices delivered F. O. B. cars at your city.

GULF STATES CREOSOTING CO.

P. O. Box No. 1022 Atlanta, Ga.

ELECTRIC power at the main switch, steam at the boiler or water at the intake have no productive value until they are properly distributed.

So with light. A flood of light may produce feast at one point and famine elsewhere — unless walls are changed from light absorbers into light distributors.

Light is your most valuable productive power. It costs nothing and requires no expensive pipe lines to distribute. All you require to distribute light everywhere that you need it is PAINT—Hampden *Sunray* Mill White Oil Paint—which "Sun Surfaces" walls and turns them into light diffusing reflectors and distributors of light.

Hampden *Sunray* Mill White is an oil paint with a long lived tile-like surface that is smooth and hard but sufficiently flexible to withstand vibrations—a surface so white that it diffuses an unusually high percentage of light. It's washable, too.

Three Finishes—Gloss—Eggshell—Flat. Deliveries Direct From Factory or Local Dealers. Further Particulars mailed on request, also our booklet "Whitest White" which contains useful information about industrial lighting.

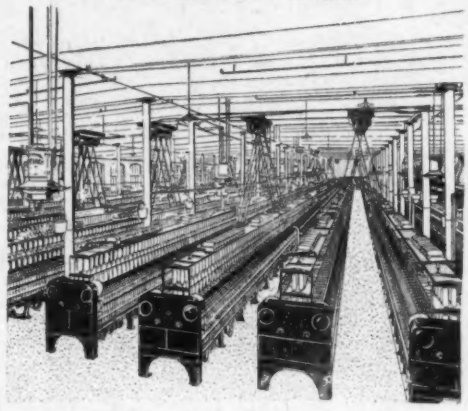
HAMPDEN PAINT AND CHEMICAL CO.

Makers of Good Paint for 68 Years

SPRINGFIELD, MASSACHUSETTS

PAINT Hampden COATINGS

"Made to Wear Where the Wear is Hardest"



Reflection--

The Cheapest Form of Light

To pick up and return (by reflection) light from dark corners requires the most *intense white.* It must be sufficiently *dense* or *opaque* in its nature to hide the surface if need be. It must be composed of such materials that age does not tend to change its *whiteness.*

The above qualities are a true description of

SCO-CO
Cotton White

"Makes the sun pay dividends"

We are in position to demonstrate that SCO-CO Cotton White (made in Flat, Eggshell and Gloss) delivers a greater percentage of light over a longer period of years than any similar product.

For more information about better paints, write—

THE SOUTHERN COTTON OIL CO.
Paint Products Division
SAVANNAH, GEORGIA

SCO-CO

SCO-CO

You'll do better Painting With "SCO-CO"

Lane's UNIQUE Ratchet Tools

STANDARD SET
Consists of Ten Pieces

1—7-inch Ratchet Wrench (Drop-Forged)
2—Screw Driver Bits
7—Sockets—turned from solid round bar (Machinery Steel)—broached hexagon openings—fitting U. S. Standard Cap Screws 5-16 inch to 5-8 inch (except 9-16 inch) and Hexagon Nuts—1-4 inch to 1-2 inch (except 7-16 inch). S.A.E. Cap Screws and Hexagon Nuts 5-16 inch to 9-16 inch

Size of Socket Openings

1-2 inch fits { 1-4 inch Hexagon Nut / 5-16 inch Cap Screw
9-16 inch fits 3-8 inch Cap Screw
39-64 inch fits 5-16 inch Hexagon Nut
5-8 inch fits 7-16 inch Cap Screw
11-16 inch fits 3-8 inch Hexagon Nut
3-4 inch fits 1-2 inch Cap Screw
7-8 inch fits { 1-2 inch Hexagon Nut / 9-16 inch Cap Screw S.A.E. / 5-8 inch Cap Screw U. S.

Packed in strong Black Fibreroid Case
Weight 22 ounces

LIST PRICE, $4.00

WILL B. LANE UNIQUE TOOL CO.,
180 N. Dearborn St., Chicago, Ill.

Ball Bearings
On Spinning Frame Cylinders

Save 95% of the oil you have been using for the cylinders, and stop the mess and dirt caused by flying, spattering oil.

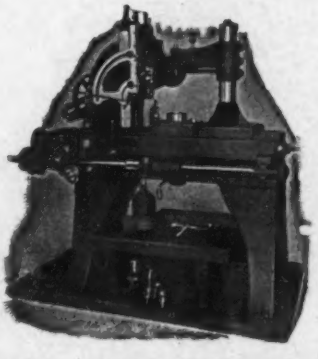
With ball bearings there is a saving in power, and it is easier to keep your cylinder speed right.

Write to us for further information.

ALDRICH MACHINE WORKS
Ball Bearings
Greenwood, S. C.

Full Automatic, Semi-Automatic and Hand Operated

Gear Cutting Machines



Especially adapted for use in Cotton Mills Hundreds now in use. Send for Special Circulars.

The D. E. Whiton Machine Co.,
NEW LONDON, CONN.

THE JOHNSON FRICTION CLUTCH

A Better Control for Textile Machinery

You will find the Johnson Clutch a most satisfactory means of driving textile machinery. More efficient and more convenient than the tight and loose pulley. Equally desirable on motor drives.

Made in both single and double types to fit standard pulley sizes. Clean, compact and durable. Grips smoothly and is easily adjusted to any tension.

Ask for the Johnson Clutch on your new machine equipment.

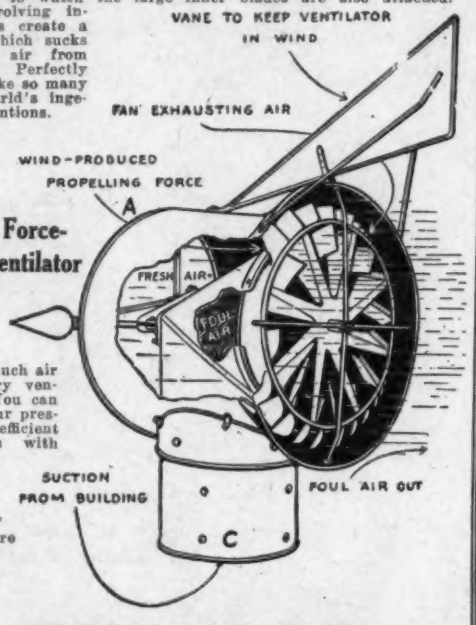
Ask for our Catalog "G"

Single Clutch Broken Away.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

The Wind-Mill Principle Applied to a Ventilator

Note the illustration! The fresh air passing over the funnel comes in contact with the small outer blades, thereby propelling the wheel to which the large inner blades are also attached. These revolving inner blades create a vacuum which sucks the foul air from below. Perfectly simple—like so many of the world's ingenious inventions.



Carlisle Force-Draft Ventilator

displaces from 5 to 6 times as much air as ordinary ventilators. You can replace your present inefficient Ventilators with fewer and smaller sized "Carlisles" and get more ventilation! Write for descriptive folders.

CARLISLE & GALE CO.

569-577 Albany St. Boston, 18, Mass.

This Miller Takes the Place of a Keyseating Machine

Moreover, it will keyseat jobs that a keyseating machine can't touch.

The tool is conveniently used on large and small work. It is commercially used in shops large and small. The miller can be attached to a drill press as rapidly as any straight shank drill. Taper shanks can be had if desired. The Miller is fitted with a high-speed steel rotary cutter that mills internal keyseats in one cut. To complete a keyseat it is only required to pass the tool thru the hole just once. Now is the time you need this tool.

Get Catalog C.

National Machine Tool Co.

2274 Spring Grove Ave., Cincinnati, O., U. S. A.
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Smith-Courtney Co., Richmond, Va.
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CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also proceed merit as surely in machinery as in men.

Time, skill and effort must also proceed merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

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PHILADELPHIA, PENNA.

Branch Office, 141 Milk St., Boston, Mass.

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LET us furnish estimates on your painting. We can refer you to scores of big mills throughout the United States that we have painted.

Write or phone us today.

H. NEWTON MARSHALL CO.

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ATLANTA, GA. BOSTON, MASS.

D. R. Hall, Southern Manager

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Jenkins Standard Brass Swing Check Valves

For 150 pounds working pressure. Fitted with Jenkins Renewable discs. The angle of the seat is such that it opens readily at low pressures, and the shock in closing under high pressure in the most severe service is absorbed in the line piping. The disc lifts well out of the passage when wide open.

Know genuine Jenkins Valves by the name and Jenkins Diamond Mark—at supply houses everywhere.

Figure 352

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San Francisco Washington Montreal London Havana
FACTORIES: Bridgeport, Conn. Elizabeth, N. J. Montreal, Canada.

Jenkins Valves
SINCE 1864

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PROMPT DELIVERY 99.5 PURE

WE have cut the cost of welding to our customers to the minimum by installing oxygen supply stations at convenient points over the South. These stations can ship oxygen to you on short notice and being located near you the freight cost is negligible.

Perfection and economy in welding depends on the purity of the oxygen. When you use STANDARD OXYGEN you are reducing your welding costs to the minimum for STANDARD Oxygen is 99½% pure—the best that can be bought.

STANDARD is the first company in the South to manufacture oxygen, and satisfaction is insured by prompt shipments, full measure and absolute purity of oxygen. This satisfaction is attested to by the fact that our business has increased over 800% in the last two years.

There's a service station located near you. Write the one nearest you.

STANDARD GAS PRODUCTS CO., INC.
ATLANTA
CHATTANOOGA, GRETNA, LA.

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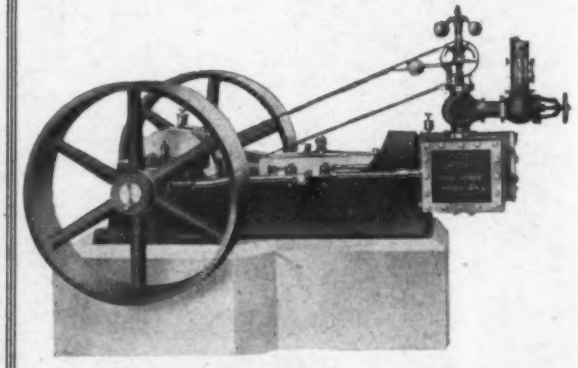

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Macon, Georgia

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High Pressure Return Tubular Boilers, High Grade Stationary Steam Engines, Tanks, Stacks, Stand Pipes. Heavy Castings and Wrought Iron Works.

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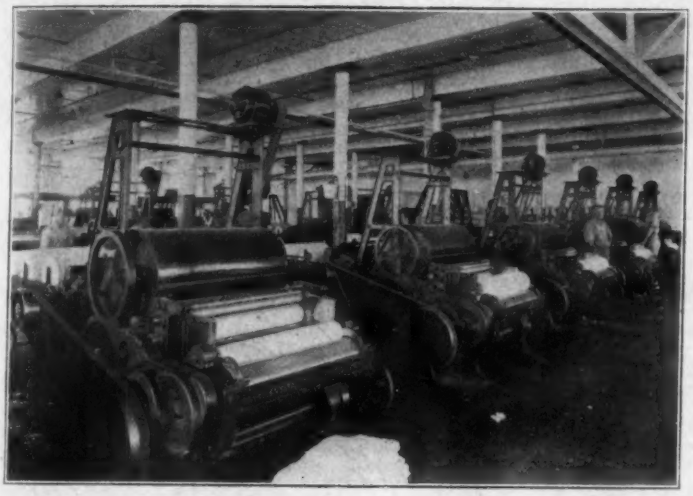

Another Picker Room

Equipped with

Allis-Chalmers

Textile Motors.

Send for Textile Bulletin.

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MILWAUKEE, WIS. U. S. A.

Speed in Service is Only Rivaled by Accuracy

Each Would Be Useless Without the Other

Unfailing Service

In the struggle and stress of modern business life every moment of delay represents a loss of time and money which cannot be regained.

When promptness, accuracy and dispatch are the vital elements in the delivery of electric equipment or supplies it is natural to turn to the Carter Electric Company for service.

This is an organization whose members are trained to meet the demands of any emergency and this organization is ready to serve you on an instant's notice.

If your requirements cover Rubber Conduit Wire, Switches, Safety Switches, Wiring Devices, Fuses, Lamps or other electric supplies, it is only a matter of a few hours before we can place them in your hands.

This is because our warehouses are always fully stocked—everything you may need and in large quantities—and with every modern facility for handling your business the Carter Electric Company pledges you **Unfailing Service.**

Carter Electric Company

63 Peachtree Street, Atlanta

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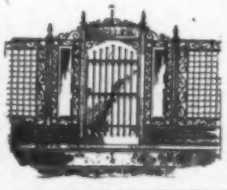
Cast Iron Columns
FOR
COTTON MILL CONSTRUCTION

American Cast Iron Pipe Company
COLUMN DEPARTMENT BIRMINGHAM, ALA.
NEW YORK OFFICE: 261 BROADWAY



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WINDOW GUARDS
WIRE CLOTH
Established 1835.
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POWER & HAND PUMPS DAIRY SUPPLIES
PROMPT SERVICE.
HACKNEY BROTHERS CO.
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CANDLER BLDG., - ATLANTA, GA.
All classes of buildings constructed promptly and efficiently and at reasonable prices.

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HUGHES SPECIALTY WELL DRILLING CO.
CHARLESTON ATLANTA
Established 1885

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Office Phones—478—2713—Postal Phone
Long Distance—9929
Branch Office: E. A. CUTTS & SON, Augusta, Ga.

WELDING & REPAIRS

SOUTHERN WELDING & MACHINE CO.
190 COURTLAND STREET ATLANTA, GA.
Gear Cutting and Machine Work.
No job too large or too small for us.
We specialize in cotton mill and oil mill welding and machine work
Oxy-Acetylene and Electric Welding

Advertising conserves the Manufacturer's time by acquainting him with a service or product at his leisure long before the need for such arises.

Commission Merchants, Yarn Dealers, Cotton Dealers and Brokers, Banks, Etc.

The Recognized Standards of Quality

COTTON YARNS

Our Fine Yarns Make Fine Fabrics

The manufacturers of a number of America's well known textile products can vouch for the strength, uniformity, cleanliness, and better weaving and knitting qualities of our yarns.

The yarns we spin for knitting, weaving, laces and converting, are furnished in all twists on skeins, cones, tubes and warps:

30s to 80s Single and Ply Combed Peeler Right Twist. 36s to 50s Single and Ply Double Carded Peeler, Right or Reverse Twist.

20s to 60s, 2, 3, and 4 Ply, Combed Peeler, Reverse Twist.

Our products are sold direct and exclusively through our General Sales Offices:
225 Fifth Avenue at 26th Street, New York.
H. A. FLORSHEIM, Sales Manager
Long Distance Phone: Madison Sq. 3472-3
New England Representative
H. D. Skinner,
212 Summer St. Boston, Mass.

Gray Manufacturing Co.
Arrow Mills, Inc.

Parkdale Mills, Inc.
Flint Manufacturing Co.
Arkray Mills, Inc.

Arlington Cotton Mills
Myrtle Mills, Inc.

Weimar Bros.

Phone Connections
Works, 2046-48 Amber Street,
PHILADELPHIA, PA.

MANUFACTURERS OF

Cotton Mercerized Tapes, Spool Tapes, Bindings and Narrow Fabrics for Underwear and other Trades.

Where the Buyer Benefits

How More Favorable Buying Conditions are Being Created by Advertising in This Paper at This Time.

Through regular advertising, sellers are making buying opportunities, instantly available. By publicly committing themselves in their advertising, they are giving you a strong assurance of faithful performance.

Advertisers are cutting sales costs through the use of advertising as a SALES MACHINE just as they reduce production costs by improved machinery methods.

This means ability to make LOWER PRICES to you.

Advertising in a buyer's own paper caters to his convenience; it saves the buyer's time; it helps the buyer weigh and balance rival claims; when the salesman calls, it saves the time of both buyer and salesman by providing the foundation for intelligent judgment.

The seller who is building reputation through advertising will jealously guard that reputation in every transaction, beginning with the merit of the merchandise.

Advertising indicates progressiveness, not alone in selling, but throughout the entire business.

By advertising, the seller is publicly displaying his ability and desire to serve you, instead of silently relying upon the necessity of the buyer to produce orders.

IF YOU NEED BANKING SERVICE

in the South,
and especially in Georgia

You need The Citizens & Southern

Capital and Surplus $4,500,000

The Citizens & Southern system has completely equipped offices in Atlanta, Savannah, Macon and Augusta.

Each of these offices is connected with the others by direct private wires.

If you are a customer of either office, and want information or service of any kind from the other cities these wires and the complete organization are at your service.

Hundreds of direct correspondents all over the south makes it possible to give you practically the same service wherever you want it.

The Citizens & Southern Bank

Atlanta—Marietta at Broad

Savannah Macon Augusta

No account too large, none too small"

ESTABLISHED 1872

H. & B. BEER

NEW ORLEANS

HENRY BEER EDGAR H. BRIGHT
J. WILLIAM BARKDULL C. MORGAN ABRAMS

MEMBERS OF

New Orleans Cotton Exchange
New Orleans Future Brokers Association
New York Stock Exchange
New York Cotton Exchange
New York Coffee Exchange
New York Produce Exchange
Chicago Board of Trade

Associate Members of the Liverpool Cotton Association

Private Wires to Principal Points

WOODWARD, BALDWIN & CO.

DRY GOODS

Commission Merchants

43-45 WORTH STREET, NEW YORK

HUGHES FAWCETT

IMPORTER AND COMMISSION MERCHANT

LINEN YARNS

For Weaving, Knitting and all Purposes.

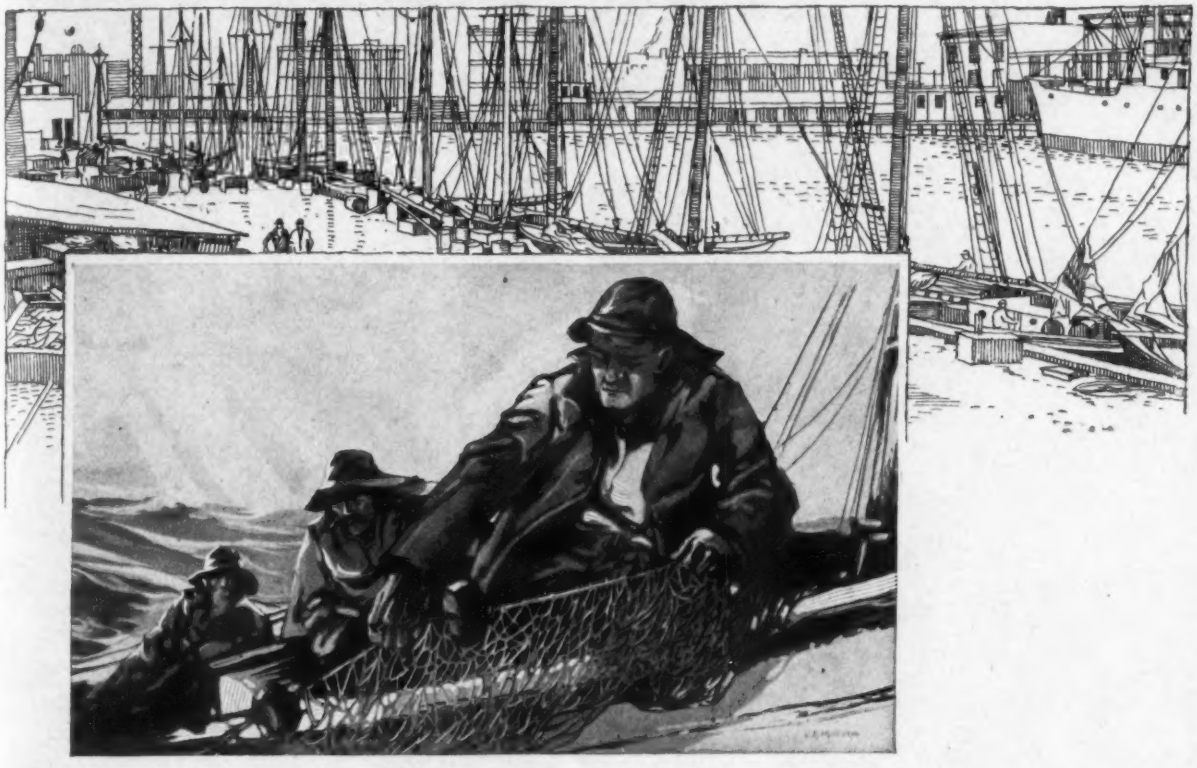
TURKEY RED YARNS

For Towel Borders, Towellings and Bleaching Cloth

Linen Jacquard Harness Twine

And Every Description of Linen Thread and Twine

115 Franklin Street, : NEW YORK



New England contributes to the world's table

In Colonial days, when codfish was legal tender for the payment of debt, New England laid the foundation for a seafood trade even then extending overseas. That trade has expanded steadily. Hundreds of tons of fish and fish preparations are now shipped each week to foreign and domestic markets. Boston is the largest fishing port in the country, with Gloucester pressing for a close second.

New England's contribution to the nation's table also includes shipments of cereals, grain products, fruits and vegetables. This territory raises more field corn to the acre than the Middle Western States. Fine-textured berries, apples, potatoes and onions from the many well-favored localities are in strong demand in nearby and distant cities.

The National Shawmut Bank has been participating actively in the upbuilding of New England food industries for more than 85 years. We are firmly established in the confidence of these industries—well situated to act as an intermediary in any transaction in which we can be of service.

THE NATIONAL SHAWMUT BANK *of* BOSTON

Resources far exceed $200,000,000

WORKMEN'S COMPENSATION INSURANCE AT COST

THE MILLERS INDEMNITY UNDERWRITERS offers to the textile mills of Georgia insurance under the Workmen's Compensation Act at a saving of from twenty-five to thirty per cent of the premiums. In view of the fact that the rates under this new Law will be somewhat higher, such a saving is increasingly important.

We have maintained a Division Office in this State for the past two years, and SERVICE with us is no experiment.

MILLERS INDEMNITY UNDERWRITERS

BAILEY & COLLINS, Managers

Atlanta ***Dallas*** ***New Orleans*** ***Greenville***

Textile Banking Company

Incorporated

Factors

FIFTY UNION SQUARE, NEW YORK

will undertake factoring contracts with manufacturers and selling agents, providing a service of credit approval which *eliminates* the credit risk, and obviates the expense, uncertainty and delays usually incident to collections.

The release of working capital through the immediate *cashing of accounts* approved by and *made payable to the Textile Banking Company*, enables manufacturers and selling agents to increase their volume of sales.

The Textile Banking Company has strong financial connections and its officers have had many years experience in the distribution and financing of textile lines.

Correspondence or interview invited.

Disinterested Investment Service

Those actively engaged in the conduct of large affairs must necessarily devote a great deal of study to basic industrial and financial conditions. They often find it difficult to keep thoroughly informed regarding day to day features of many different classes of investments.

The National Bank of Commerce in New York through its Bond Department, offers to its friends the benefit of extensive experience and close studies of investment values. It is equipped to handle this class of business for them efficiently in all domestic and foreign financial centers.

Our advice and assistance in the purchase of securities are impartial and disinterested.

National Bank of Commerce in New York

Capital, Surplus and Undivided Profits
Over Fifty-five Million Dollars

1865 **The Oldest National Bank in the Cotton States** 192

The Atlanta National Bank

and

Selling A Service

The Atlanta National Bank sells SERVICE—just as a grocer sells groceries, a clothier sells clothes or a jeweler sells jewels. "Service" is the Bank's stock in trade.

It is the quality of the SERVICE that eventually regulates the size and importance of the bank.

If the SERVICE is good the Bank goes ahead; if it is bad the Bank goes back.

Since 1865 the Atlanta National Bank has endeavored to render service to its depositors unsurpassed by the service of any other Bank.

The SERVICE had included not only every COMFORT and CONVENIENCE for the rapid and accurate transaction of business, but CORDIAL CO-OPERATION and COMPLETE SECURITY.

The QUALITY of Atlanta National Service has been largely responsible for its growth from its modest beginning when it was the ONLY NATIONAL BANK IN THE COTTON STATES, to an institution which has merited confidence both at home and abroad.

New accounts cordially invited.

The Atlanta National Bank

Active Designated Depository for
United States Government, State of Georgia, County of Fulton and City of Atlanta

CLASSIFIED ADVERTISING

FOR SALE

Nine barrels Fustic Extract—Newbert Color Company. Forty-nine barrels Cutch Extract—Oakes Manufacturing Company and Whittemore-Wright. Ten barrels Yorkshire Gum—Arabol Manufacturing Company. Fifty barrels Acme Size—Arabol Manufacturing Company. Eight barrels Acetic Acid. Four barrels Blue Stone. Eight barrels Pyrolignite of Iron—A. Klipstein Company. Two barrels Copperas. Three barrels Glucose. This is excess material and we will dispose of it at a very attractive price.

UNION BLEACHING & FINISHING COMPANY,
Greenville, S. C.

RATES:

DISPLAYED.

"For Sale" and all other advertisements using bold-face type or otherwise displayed, $2.00 per inch per insertion.

Rates for larger spaces furnished on application.

WITHOUT DISPLAY.

"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

"Positions Open" and other undisplayed advertisements, 4 cents per word per insertion. Minimum charge $1.00. Payable in advance.

(When replies are to be received in our care, allow four words for box address.)

INDUSTRIAL ENGINEERING SERVICE

Industrial Engineers offer complete service in design and construction of Textile Mills, warehouses, mill villages, power plants, etc. We can assist in financing meritous enterprises. Give full particulars when writing. Box 29 care COTTON, Atlanta, Ga.

Wanted—Salesmen.

Salesmen calling on the textile mills, and interested in new lines of machinery, paints, building supplies or chemicals, either as a side line or exclusively will find it profitable to write, giving experience, territory covered and other details. Correspondence strictly confidential. Cotton, 1021 Grant Building, Atlanta, Ga.

Do You Want To Sell It?

Probably you, like many other mills, have some equipment or machinery which you have taken out, or are thinking of taking out and replacing with new equipment.

Why not dispose of this second-hand equipment at a profit. COTTON is read by thousands of Cotton Mills that are hardly touched by Northern journals.

You Can Sell Your Second-Hand Equipment

to these mills through advertising in the Classified Advertising Section of COTTON. Such advertising produces results at small cost—why not try it out and get that second-hand equipment off your hands in a profitable way? Tell us what you have for sale and let us insert an advertisement for you.

COTTON

Grant Building, Atlanta, Ga.

CLASSIFIED ADVERTISING

POWER AND EQUIPMENT

POWER

48—823-H.P. Sterling Boilers, type M-30, 200 lbs. pressure with Westinghouse S retort stokers.
5—500-H.P. Keeler water tube boilers, 160 lbs. pressure with Wetzel stokers.
40—18x36, 350-H.P. Allis-Chalmers Corliss Engines, heavy duty, double eccentric.
1—3500 K.W. General Electric Condensing Turbine, three phase, 60 cycle, 2300 volts.
2—3000 K.W. General Electric Condensing Turbines, three phase, 60 cycle, 2300 volts.
2—1000 K.W. Allis-Chalmers Non-Condensing Turbines, three phase, 60 cycle, 2300 volts.
800—Motors, all 3 phase, 60 cycle, 440 and 2300 volts, standard makes, from one-quarter to 300 H.P.
3—No. 5 Allis-Chalmers Vertical High Vacuum Jet Condensers.
1—Westinghouse-LeBlanc Condenser (for 3500 K.W. Turbo).
6—15-26x20x24 Compound Duplex L. D. G. Compressors, feather valve, 60 lbs.
2—9-17x15-9x12 Compound L. D. G. Compressors, 110 lbs.

SUPPLIES

Acid Pumps
Machine Tools
175 miles Pipe, all sizes
Corrugated Iron
2000 Wood Tanks
Steel Tanks
Belting
Shafting and Pulleys
Ice Plants
Acid Recovery Plants
Machine Tools
Mill Supplies
Plumbing Materials
Heating Equipment
Chemical Equipment
Steel Buildings
Building Material
Restaurant Equipment
Acid Making Plants
Causticizing Plant

PUMPS

10—14-inch Worthington 8600 gpm, 152' head Centrifugal Pumps, dc to 300 H.P. General Electric Motors.
2—10-inch Worthington Type S Centrifugal Pumps, dc to 150 H.P. Westinghouse, 3 phase, 60 cycle, 2300 volt Motors, 3750 gpm, at 130' head.
4—14-inch Worthington Type S, 7500 gpm, 130' head, 300 H.P. General Electric Motors, 2300 volts.
6—14-inch Allis-Chalmers Type S, 6500 gpm, 150' or 8100 at 90' dc to Steam Turbine.
6—16-inch Allis-Chalmers Type S, 8500 gpm, 90' head dc to Steam Turbine.
3—8-inch A.W.W., 1000 gpm, Centrifugal, dc to 100 H.P. Westinghouse, 2300 volt Motors, 1000 gpm, 125 lbs.
6—14-20x7½x18 Worthington Compound Duplex O.P. Pumps, 400 gpm, 300 lbs. pressure.
10—25-38x4-⅝x24 Worthington Tandem Compound Duplex Pumps, 150 gpm, 3600 lbs. pressure.
3—20x12x16 Duplex Underwriters Fire Pumps, 1500 gpm, 100 lbs. pressure.
75—Diaphragm Pumps, all sizes, gasoline, electric, and hand operated.

Write or wire for specifications and prices on the above new and practically new equipment of the government's $87,000,000 OLD HICKORY project.

THE NASHVILLE INDUSTRIAL CORPORATION
OLD HICKORY, TENN.

New and Second Hand

ENGINES

Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING

Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors

AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,
127-31 N. Third St.
Philadelphia, - Pennsylvania

We Have for Immediate Delivery

One Whitin equipment consisting of 6500 spindles balanced for 24's to 30's hard yarn all transmission and supplies for immediate delivery at $15.00 per spindle F. O. B. cars western shipping point, or would sell this plant as a going proposition including real estate at $20.00 per spindle.

We Have the Following Roving Machines for Prompt Delivery:

2—12x6 H. & B. Slubbers 60 spindles each
1—12x6 H. & B. Slubber 56 spindles
4—10x5 H. & B. Intermediates 108 spindles each
2—10x5 Providence Speeders 102 spindles each
4— 8x3½ H. & B. Speeders 144 spindles each
5— 7x3½ Saco Pettee Speeders 156 spindles each.

All at a very attractive price for prompt delivery

C. L. Upchurch, Textile Machinery
804 Austell Building
P. O. Box 1411 ***ATLANTA, GA.*** *Phone: Ivy 5706*

Buyers' Index

Acetylene Welding Apparatus.
(See Welding Apparatus).

Acetylene Gas.
Commercial Acetylene Supply Co.
Southern Welding & Mach. Co.
Standard Gas Products Co.

Accountants.
(See Auditors and Accountants).

Adding Machines.
Monroe Calculating Mch. Co.

Air Brakes.
Allis-Chalmers Mfg. Co.

Air Washers.
American Blower Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

Air Conditioning Systems.
(See Humidifying Apparatus).

Albone.
Roessler & Hasslacher Chemical Co.

Alkalies.
(See Dyestuffs and Chemicals).

Aniline Colors.
(See Dystuffs and Chemicals).

Anti-Chlorine.
(See Dyestuffs and Chemicals).

Aprons-Rub.
Ladew & Co., Inc., Edw. R.
Smith & Furbush Machine Co.
Graton & Knight Mfg. Co.

Architects and Engineers.
American City Eng'g Co.
Dowman, George.
Ferguson Co., John W.
Lockwood, Greene & Co.
Robert & Co.
Spiker & Lose.
Sirrine, J. E.
Thompson & Binger, Inc.
Tufts Co., Arthur.

Ash Handling Machinery.
(See Coal Handling Machinery).

Asphalt Slate Shingles.
(See Slate Asphalt Roofing).

Auditors and Accountants.
American Audit Co.
Ernst & Ernst.
Gregory & Gregory, Walter.

Auto Trucks.
(See Trucks—Auto).

Automatic Controllers (Temperature).
(See Temperature Controllers.)

Automatic Loom Attachments.
(See Loom Attachments).

Automatic Feeds for Cotton.
Proctor & Schwartz, Inc.
Saco Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Mch. Co.
Whitin Mch. Works.

Automatic Guider (Electric).
Blake Electric Mfg. Co.

Backwashers.
Sargent's Sons Corp., C. G.

Automatic Scales.
(See Scales).

Ball Bearings.
Aldrich Mch. Works.
Campbell Mfg. Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
S K F Industries.
U. S. Ball Bearing Co.

Ball Bearing Housings.
Aldrich Mch. Works.
Fafnir Bearing Co.

Ball Bearing Top Rolls.
Campbell Mfg. Co.

Bale Band Buckles.
(See Box Strapping & Buckles).

Bale and Box Ties.
Lovingood Co.
Regnas Co., J. R.
Signode System, Inc.

Baling Machines.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Galland-Henning Mfg. Co.
Williams & Sons, I. B.
Hulme, J. S.
Saco-Lowell Shops.

Baling Presses.
(See Presses).

Bandages, Tapes, Etc.
American Textile Banding Co.

Bands.
(See Tapes).

Banding Straps and Buckles.
Lovingood Co.
Regnas Co., J. R.
Signode System, Inc.

Bands (Self-Tying).
Campbell Mfg. Co.

Banks.
Atlanta National Bank.
Citizens & Southern Bank.
Irving National Bank.
National Bank of Commerce In New York.
National Shawmut Bank.
Textile Banking Co., Inc.

Barometers (Mercurial).
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Barrels—Fibre.
(See Fibre Products).

Baskets—Mill.
(See Boxes—Mill).

Bath Cabinet—Shower.
Manufacturing Equipment & Engineering Co.
Shower Bath Cabinet Co.

Batteries (Elec.).
(See Storage Batteries).

Beam Dyeing Machines.
Cocker Mchry. & Foundry Co.

Beam Heads (Steel).
Mossberg Co., Frank.

Beaming and Warping Mchry.
(See Warpers and Warping Machinery).

Bearings.
Chicago Pulley & Shafting Co.
Creason-Morris Co.
Diamond State Fibre Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Standard Pressed Steel Co.
S K F Industries.
U. S. Ball Bearing Co.
Wood's Sons Co., T. B.

Belting.
American Supply Co.
Augusta Mill Supply Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Russell Mfg. Co.
U. S. Rubber Co.
Walraven Co.
Williams & Co., I. B.

Belting—Chain Link.
Link-Belt Company.
Morse Chain Co.

Belting—Rope.
(See Rope Transmission).

Belt Conveyors.
Link-Belt Company.
Mathews Gravity Carrier Co.
Morse Chain Co.
Portable Machinery Co.

Belt Dressing.
Jos. Dixon Crucible Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Walraven Co.
Williams & Co., I. B.

Belt Fasteners.
Flexible Steel Lacing Co.

Belt Lacing.
Augusta Mill Supply Co.
Flexible Steel Lacing Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Walraven Co.

Belt Tighteners.
Link-Belt Company.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

Benches (Park and Playground).
(See Playground Equipment).

Billiard Tables, Etc.
Brunswick-Balke-Collender Co.

Bleacheries.
(See Dyers, Bleachers and Finishers).

Bleaching Kiers.
Butterworth & Sons Co., H. W.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machinery Co., The.

Bleaching Machinery.
(See Dyeing, Bleaching and Finishing Machinery).

Bleaching, Finishing and Sizing Materials.
(See Finishing Materials).

Blowers and Blower Systems.
American Blower Co.
Carlisle & Gale Co.
Carrier Eng. Corp.
General Electric Co.
Perkins & Son, B. F.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

Boards—Fibre.
Diamond State Fibre Co.

Boards—Form.
Pearson, Jos. T.

Bobbins.
Draper Corporation.
Greenville Spool & Mfg. Co.
Jordan Mfg. Co.
Shambow Shuttle Co.
Walraven Co.
Whitin Machine Works.

Bobbin Heads.
Diamond State Fibre Co.

Boilers.
International Engineering Works, Inc.
Jones Machinery Corp.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Boiler Feed Water Purification.
American Water Softener Co.
Borromite Co. of America.
Hulme, J. S.
Permutit Co.
Refinite Co.
Scaife & Sons, Wm. B.

Boiler Room Fittings & Supplies.
Crane Co.
Detroit Stoker Co.
International Engineering Co.
Jenkins Bros.
Lunkenheimer Co.
Nashville Industrial Corp.
Sherwood Mfg. Co.

Boiler Grates and Stokers.
(See Grates and Stokers).

Boiler Graphite.
Jos. Dixon Crucible Co.

Bookkeeping Machines.
Monroe Calculating Mch. Co.

Box Strapping and Tie Buckles.
(See Banding Straps & Buckles).

Boxes—Mill.
Diamond State Fibre Co.
Hightower Box & Tank Co.
Keystone Fibre Co.
Lane & Bros., W. T.
Standard Fibre Co.

Boxes—Packing.
(See Packing Boxes).

Bowling Alleys, Etc.
Brunswick-Balke-Collender Co.

Braid.
(See Tapes).

Brake Linings.
Diamond State Fibre Co.

Brazing.
(See Welding).

Brokers—Cotton.
(See Cotton Dealers & Brokers).

Brokers—Stock.
(See Stocks and Bonds).

Brooms.
(See Brushes.

Brushes—Mill.
Atlanta Brush Co.
Southern Brush & Broom Co.

Brushes—Commutator.
Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Buckets and Pails—Mill.
Keystone Fibre Co.
Standard Fibre Co.

Buckets—Elevator and Grab.
Link-Belt Company.

Buckles—Cotton Tie.
(See Box Strapping and Ties)

Building Contractors.
(See Contractors).

Buildings—Portable.
Dowman, George.
Lockwood, Greene & Co.

Building Material.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Barrett Co., The.
Birmingham Slag Co.
Detroit Steel Products Co.
Dowman, George.
Dufur & Co.
Kirkpatrick Lumber & Timber Co.
Lockwood, Green & Co,
Seawell, Luke.
Southern Cotton Oil Co.
Southern Cypress Mfg. Asso.

Bungalows.
(See Houses—Ready Built).

Burr Pickers.
Sargent's Sons, C. G.
Smith & Furbush Machine Co.

Bushings.
Diamond State Fibre Co.
Southern Spindle & Flyer Co.
Shambow Shuttle Co.
Walraven Co.

Cabinets.
(See Lockers).

Calculating Machines.
Monroe Calculating Mch. Co.

Calenders.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co.

Calender Rolls.
Campbell Mfg. Co.
Butterworth & Sons Co., H. W.
Roy & Son, B. S.
Perkins & Son, Inc., B. F.
Textile Finishing Machinery Co.

Calling System—Inter-Telephone.
Carter Electric Co.

Cans—Roving.
Diamond State Fibre Co.
Keystone Fibre Co.
Standard Fibre Co.

Canvas Lugs.
Augusta Mill Supply Co.

Cars and Trucks—Fibre.
(See Trucks).

Car Unloaders.
Portable Machinery Co.

Carbonizing Machines.
Cocker Mch. & Fdry Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Salem Iron Wks.
Sargent's Sons & Co., C. G.
Textile Finishing Machinery Co. The.
Tolhurst Mch. Wks.
Howard Bros. Mfg. Co.

Carding Machinery and Supplies.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Clothing.
Howard Bros. Mfg. Co.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Feeds.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.
Whitin Machine Co.

We Specialize on the Design and manufacture of

TOP ROLLS

For
Drawing,
Roving
and Spinning

Campbell Manufacturing Company

Main Office
Slater Building
Worcester, Mass.

Factory
Barre Plains
Massachusetts

Factory, Warehouse and Office Receptacles

TAPER BASKETS
WASTE BASKETS
OVAL CANS
GILL CANS
BARRELS

Get the FACTS
CONCERNING
Our NEW TYPE
Trucks and Boxes

YOUR NEXT ORDER SHOULD SPECIFY "CONTINUOUS ANGLE AND BOTTOM CORNER CONSTRUCTION;" SENDING SAME TO THE

STANDARD FIBRE CO.
MILLER STREET SOMERVILLE, MASSACHUSETTS

No-Waste
SEAMLESS ROVING CANS
IN SIX DIFFERENT DIAMETERS
AND
TWO STYLES OF TOP RIM.

BUYERS' INDEX—Continued.

Card Grinding Machinery.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Carpet Machinery.
Butterworth, H. W., & Sons Co.
Crompton & Knowles Loom Wks.
Proctor & Schwartz, Inc.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Carrier Aprons.
(See Aprons).

Carrier System.
Mathews Gravity Carrier Co.

Cases—Wooden.
(See Boxes).

Casement Window Hardware.
Dowman, George.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

Castings.
American Cast Iron Pipe Co.
Cresson-Morris Co.
Lombard Foundry & Mch. Co.
Walsh & Weidner Boiler Co.

Cast Iron Columns.
American Cast Iron Pipe Co.

Caustic Soda.
(See Bleaching Materials).

Cement Machinery.
Allis-Chalmers Mfg. Co.

Cement Reinforcement.
Birmingham Slag Co.

Cement and Brick Coating.
Cooledge & Sons, F. J.
Dixon Crucible Co., Jos.
Peaslee-Gaulbert Co., Inc.
Patterson-Sargent Co.
Tropical Paint Co.
Wadsworth Howland & Co., Inc.

Centrifugals.
Cresson-Morris Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

Chain Drives.
(See Belting—Chain Link).

Chain—Block, Bicycle, Auto, Engine, Agricultural, Etc.)
Morse Chain Co.

Chairs and Stools.
Manufacturing Equipment & Engineering Co.
Pick & Sons, Albert.
Reischmann Co.
Wright Co.

Chemicals.
(See Dyestuffs and Chemicals).

Chlorine Gas.
Electro Bleaching Gas Co.

Cleaning Machine—Suction.
United Electric Co.

Clocks—Hank, Etc.
(See Counters).

Clocks—Time.
Eco Clock Co.

Clocks—Watchman.
Eco Clock Co.
Chicago Watchman Clock Co.
Dixie Electric Equip. Co.

Closets—Water.
(See Toilets).

Cloth Cutters.
Firsching, J. A.
Wildman Mfg. Co.

Cloth Guider (Electric).
Blake Electric Mfg. Co.

Cloth Room Machinery.
Butterworth, H. W., & Sons Co.
Firsching, J. A.
Saco-Lowell Shops.
Scott & Co., Henry L.
Textile Finishing Machinery Co.
Wildman Mfg. Co.

Cloth Shrinking Machinery.
Reliance Machine Works.
Tolhurst Mch. Wks.

Cloth Testers.
Scott & Co., Henry L.

Cloth Winders.
(See Winders).

Clutches—Friction.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Link-Belt Company.
Wood's Sons Co., T. B.

Clutch Linings.
Diamond State Fibre Co.

Coal.
U. S. Fuel Corp.

Coal & Ash Handling Machinery.
Link-Belt Company.
Portable Machinery Co.

Coal Tar Disinfectants.
(See Disinfectants).

Cocks.
(See Valves).

Color Pails.
(See Buckets—Mill).

Color Testers.
Atlas Electric Devices Co.

Comb Aprons.
(See Aprons).

Commission Merchants & Dealers.
(See Cotton Cloth Commission Merchants).

Compressors—Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Jones Mchry. Corp.
Seeger Machine Tool Co.
Walraven Co., The.

Concrete Reinforcement.
Birmingham Slag Co.

Condensers.
Allis-Chalmers Mfg. Co.
Seeger Machine Tool Co.

Conduits.
Diamond State Fibre Co.

Conduletes.
Crouse-Hinds Co.

Connectors—Frankel Solderless.
Westinghouse Elec. & Mfg. Co.

Consulting Engineers.
(See Architects and Engineers).

Contractors and Engineers—Building.
Aberthaw Construction Co.
American City Eng'g Co.
Dowman, George.
Ferguson Co., Jno. W.
Fonda Organization, The E. A.
Goode, R. L.
Gude & Co.
Robbins & Sons, J. E.
Spiker & Lose.
Thompson & Binger.
Tufts Co., Arthur.

Contractors—Electrical.
(See Electrical Engineers.

Contractors—Painting.
Marshall Co., H. Newton.

Controlling Instruments—Temperature.
General Electric Co.
Powers Regulator Co.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Conveyors—Belt.
(See Belt Conveyors).

Conveying Machinery.
American Supply Co.
Collins, J. D.
Cresson-Morris Co.
Hulme, J. S.
Link-Belt Co
Mathews Gravity Carrier Co.
Morse Chain Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Portable Machinery Co.
Richards-Wilcox Mfg. Co.
Schofield, Wm. Co.
Standard Conveyor Co.
Seeger Machine Tool Co.
Walraven Co.

Conveyors—Portable.
Portable Machinery Co.

Coolers.
(See Humidifying Apparatus.)

Coolers—Water.
(See Water Coolers).

Cooling Towers.
(See Tanks and Towers).

Copper Stamps and Stencils.
(See Stamps, Stencils, Etc.)

Cordage Machinery.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Cotton Yarn and Cloth Commission Merchants and Dealers.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Florsheim, H. A.
Hunter Mfg. & Comm. Co.
Iselin & Co., Wm.
Southern Cotton Yarn Co.
Weimar Bros.
Woodward Baldwin & Co.

Cotton Dealers and Brokers.
Beer, H. & B.
Cutts, E. A.

Cotton Mill Machinery and Supplies.
Augusta Mill Supply Co.
Barber-Colman Co.
Blake Electric Mfg. Co.
Butterworth & Sons, H. W.
Cocker Mach. & Foundry Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Firsching, J. A.
Fletcher Works.
Greist Mfg. Co.
Greenville Spool & Mfg. Co.
Howard Bros. Mfg. Co.
Howard & Bullough.
Jones Mchry. Corp.
Mason Machine Works.
Phila. Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield Co., Wm.
Shambow Shuttle Co.
Slaughter Mchry. Co., G. G.
Smith & Furbush Mach. Co.
Southern Bending Co.
Stafford Co.
Steel Heddle Mfg. Co.
Terrell Machine Co.
Textile Fininshing Machinery Co.
Tolhurst Mch. Wks.
Universal Winding Co.
Upchurch, C. L.
Walraven Co.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

Cotton Tape Loom.
Fletcher Works.
Schaum & Uhlinger.

Cotton Yarn Mills.
(See Yarn Manufacturers).

Counters—Revolution, Hank, Pick, Etc.
Slaughter, G. G.

Counters—Restaurant.
(See Restaurant Equipment.)

Coupling—Shaft.
Chicago Pulley & Shafting Co.
Cresson-Morris Co.
Wood's Sons Co., T. B.

Covers—Rollers.
Diamond State Fibre Co.

Cranes.
(See Hoists).

Crayons.
Dixon Crucible Co., Jos.
Lovingood Co.
Lowell Crayon Co.
Regnas & Co., J. R.

Creosote Oil and Creosoting.
Gulf States Creosoting Co.

Crushing Machinery.
Allis-Chalmers Mfg. Co.

Cutters—Cloth.
(See Cloth Cutters).

Cypress Lumber.
Southern Cypress Mfg. Asso.

Cutters—Thread.
(See Thread Cutters).

Dairy Supplies.
Hackney Bros. Co.

Deep Wells and Supplies.
Hughes Specialty Well Drilling Co.

Dehumidifying.
Sturtevant Co., B. F.

Delivery Cases.
(See Boxes—Packing).

Dial Scales.
(See Scales).

Dies—Steel.
(See Stamps, Stencils, Etc.).

Discs—Fibre.
Diamond State Fibre Co.

Dishes and Glassware.
Chattanooga Queensware Co.
Pick & Sons, Albert.

Disinfectants.
Barrett Co., The
Sanitas Co.

Dobby Chains.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

Doffing Boxes—Mill.
(See Boxes—Mill).

Doffing Cars.
(See Cars).

Door Closers and Checks.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

Door Hangers.
Dowman, George.
Richards-Wilcox Mfg. Co.

Door Mats—Steel.
Lovingood Co.
Regnas & Co., J. R.

Draft Gauges.
(See Gauges—Draft).

Drawing Frames.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Drills—Electric.
(See Electric Machinery).

Drinking Fountains.
(See Fountains—Drinking).

Drop Wires.
Greist Mfg. Co.
Steel Heddle Mfg. Co.

Drying Apparatus.
American Blower Co.
Sturtevant Co., B. F.

Drying Forms—Hosiery.
Pearson, Jos. T.

Drying Machinery.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co.
The.
Tolhurst Machine Works.

Dust Collectors.
(See Blowers and Blowing Systems).

Dusting Machinery.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
American Processing Co.
Franklin Process Co.
King, Habersham.

Dyeing, Bleaching, Finishing and Printing Machinery.
American Laundry Mchry. Co.
Atlas Electric Devices Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Hulme, J. S.
Klauder-Weldon Dyeing Mch. Co.
Permutit Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Refinite Co.
Reliance Machine Works.
Rome Mch. & Fdry. Co.
Salem Iron Wks.
Schaum & Uhlinger.
Textile Finishing Machinery Co.
The.
Tolhurst Machine Works.

Dyeing Machines (Package and Spool.)
Franklin Process Co.

Dye Sticks.
Phila. Drying Machinery Co.

Dyestuffs and Chemicals.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Atlantic Dyestuff Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Cibs Co., Inc.
Du Pont de Nemours & So., E. I.
Electro Bleaching Gas Co.
Ford Co., J. B.
Grasselli Chemical Co.
Kali Mfg. Co.
Klipstein & Co., A.
Lewis, John D.
Metz & Co., H. A.
Moore Oil Refining Co.
National Anfline & Chemical Co.
Newport Chemical Works, Inc.
Roessler & Hasslacher Chemical Co.
Sonneborn Sons, Inc., L.
Southern Distributing Co.
Surpass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.
Zavon Co., Inc.

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United Electric Co.

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National Metal Molding Co.

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Sherwood Mfg. Co.

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See Motors and Generators).

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(See Fans—Electric).

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(See Lamps).

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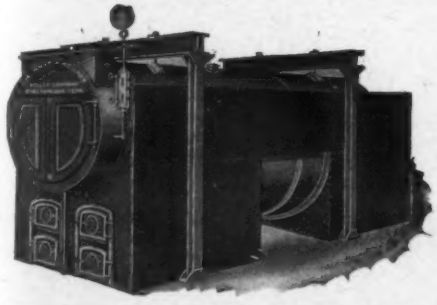

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Cooper-Hewitt Elec. Co.
Crouse-Hinds Co.
Cutter Works, George.
Economy Fuse & Fuse Co.
General Electric Co.
Hulme, J. S.
Jones Mchry. Corp.
National Metal Molding Co.
Seeger Machine Tool Co.
Slaughter Mchry. Co., G. G.
United Electric Co.
Walraven Co., The.
Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.

Electric Tractors and Trucks.
(See Tractors & Trucks—Elec).

Elevators—Portable.
Collins, J. D.
Lovingood Co.

Elevators.
Link-Belt Company.
Mathews Gravity Carrier Co.
Seeger Machine Tool Co.
Standard Conveyor Co.

Enamel—Mill White.
(See Paint).

Engineers—Mill.
(See Architects).

Engines—Oil, Gas and Gasoline.
Seeger Machine Tool Co.

Engines—Steam.
Allis-Chalmers Mfg. Co.
Jones Mchry. Corp.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Sons Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Engine Room Appliances and Supplies.
Crane Co.
Cutter Works, George.
Graton & Knight Mfg. Co.
Jenkins Bros.
Lunkenheimer Co.
Nashville Industrial Corp.
Slaughter Mchry. Co., G. G.
Sherwood Mfg. Co.
Walraven Co.
Westinghouse Electric & Mfg. Co.

Exporters—Cotton.
(See Brokers).

Extractors—Hydro.
American Laundry Mchry. Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

Fans—Electric.
Allis-Chalmers Mfg. Co.
American Blower Co.
Benjamin Electric Co.
Carter Electric Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Fans—Conveying, Power and Exhaust.
(See Blowers and Blowing Systems).

Fasteners—Belt.
(See Belt Fasteners).

Feed Water Purifiers.
(See Boiler Feed Water Purification).

Felting Machinery.
Smith & Furbush Mch. Co.

Fence—Steel and Iron.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Cyclone Fence Co.
Dowman, George.

Fibre Products.
Diamond State Fibre Co.
Keystone Fibre Co.
Standard Fibre Co.

Fillets (Calender and Doffer, Strippers, Burnishing and Emery.)
Howard Bros. Mfg. Co.

Filters—Water.
American Water Softener Co.
Borromite Co. of America.
Hulme, J. S.
Permutit Co.
Refinite Co.
Scaife & Sons Co., Wm. B.

Filters—Oil Removal.
Permutit Co.
Sherwood Mfg. Co.

Filters—Sand.
Permutit Co.

Finishing.
(See Dyers, Bleachers and Finishers).

Finishing, Bleaching and Sizing Materials.
Atlantic Dyestuff Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Corn Products Refining Co.
Dobbins Soap Mfg. Co.
Du Pont de Nemours & Co., E. I.
Electric Smelting & Alum. Co.
Electro Bleaching Gas Co.
Ford Co., J. B.
Grasselli Chemical Co.
Kali Mfg. Co.
Keever Starch Co.
Klipstein & Co., A.
National Aniline & Chemical Co.
Newport Chemical Works.
Metz & Co., H. A.
Moore Oil Refining Co.
Rock Glen Salt Co.
Roessler & Hasslacher Co.
Sonneborn Sons, Inc., L.
Southern Distributing Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.
Zavon Co., Inc.

Fire Doors and Hardware.
Dowman, George.
Richards-Wilcox Mfg. Co.
Seawell, Luke.
Vonnegut Hardware Co.

Fire Hose.
(See Hose—Fire).

Fire Protecting Paint.
(See Paint).

First Aid Room Equipment.
(See Hospital Equipment).

Flexible Couplings.
Cresson-Morris Co.

Flood Lights—Electric.
Crouse-Hinds Co.
General Electric Co.

Flooring—Hardwood.
Kirkpatrick Lumber & Tim. Co.
Southern Cypress Mfg. Co.

Floor Scrubbing Machine.
American Scrubbing Equip. Co.

Floor Sweeps.
See Brushes.

Fluted Rolls.
Campbell Mfg. Co.
Howard & Bullough.
Perkins & Son, B. F.
Saco-Lowell Shops.
Schofield & Sons, J. S.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Founders.
Cresson-Morris Co.
Lombard Fdry & Mch. Works.

Fountains—Drinking.
Central Brass Mfg. Co.
Crane Co.
Manufacturing Equipment & Engineering Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Southern States Supply Co.

Taylor, Halsey W.

Friction Clutches.
(See Clutches—Friction).

Fuel.
(See Coal).

Fuses.
(See Elec. Mchy. and Supplies).

Garage Doors and Door Hardware.
Dowman, George.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

Garnett Machines.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.

Gas Engines.
(See Engines—Gas).

Gaskets.
Diamond State Fibre Co.
Graton & Knight Mfg. Co.

Gauge Cocks.
Lunkenheimer Co.
Sherwood Mfg. Co.

Gauges—Draft.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Gauges—Mercury Column Vacuum.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Gauge—Oil.
Lunkenheimer Co.

Gauges—Pressure.
Tagliabue Mfg. Co., C. J.

Gauges—Recording.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Gauges—Water.
Lunkenheimer Co.

Gears—Silent.
Diamond State Fibre Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.

Gear Cutting and Cutters.
Cresson-Morris Co.
Southern Welding & Machine Co.
Whitin Machine Co., D. E.

Gear Pullers.
General Electric Co.
Greb Co., Inc.

Generators—Electric.
(See Motors and Generators)

Glassware and Dishes.
(See Dishes).

Governors—Pressure.
Tagliabue Mfg. Co., C. J.

Governors—Pump.
General Electric Co.
Tagliabue Mfg. Co., C. J.

Graphite Products.
Dixon Crucible Co., Jos.

Grates—Boiler.
Detroit Stoker Co.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

Grates—Mechanical.
(See Stokers).

Grease.
(See Lubricants).

Grease Cups.
(See Lubricators).

Green Houses.
Hulme, J. S.

Grindstones.
Richards-Wilcox Mfg. Co.

Grinders—Card Cylinder, Roll, Napper and Garnet.
(See Card Grinding Machinery).

Guards—Electric Lamp.
Flexible Steel Lacing Co.

Guides—Thread.
Palmer Co., I. E.

Guider (Cloth-Electric.)
Blake Electric Mfg. Co.

Gums.
(See Finishing and Sizing Materials).

Guy Anchors.
Crouse-Hinds Co.

Gymnasium Apparatus.
Medart Mfg. Co., Fred.

Hangers.
(See Shafting and Hangers).

Hardware (Building.)
Richards-Wilcox Mfg. Co.
Seawell, Luke.
Vonnegut Hardware Co.

Harness—Loom.
American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.
Southern Bending Co.

Heads—Bobbin and Spool.
Diamond State Fibre Co.

Heating and Ventilating Apparatus.
(See Ventilating Apparatus).

Heddles.
Crompton & Knowles Loom Wks.
Draper Corporation.
Howard Bros. Mfg. Co.
Steel Heddle Mfg. Co.

Heddle Frames.
Crompton & Knowles Loom Wks.
Steel Heddle Mfg. Co.

Hoists.
Curtis Pneumatic Mchry. Co.
Hulme, J. S.
Link-Belt Company.
Morse Chain Co.
Seeger Machine Tool Co.
Walraven Co.

Hose—Fire.
Collins, J. D.
U. S. Rubber Co.

Hosiery Dyeing Machinery.
Cocker Mach. & Fdry. Co.
Franklin Process Co.
Rome Mach. & Fdry. Co.

Hosiery Finishing Boards.
(See Boards).

Hosiery Forms.
(See Drying Forms).

Hosiery Yarns.
(See Yarn Manufacturers).

Hospital Equipment.
Thomas Co., F. H.
Wright Co.

Houses—Ready-Made.
Dowman, George.
Taxbury Lumber Co.

Humidifying Apparatus.
American Blower Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

Humidity Indicating Instruments.
Powers Regulator Co.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Hydraulic Turbines.
(See Turbines—Steam).

Hydro Extractors.
(See Extractors).

Hydrometers.
Taylor Instrument Co.

Hygrometers.
Taylor Instrument Co.

Hygrodeiks.
Taylor Instrument Co.

Indicating and Recording Instruments and Thermometers.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.
Tagliabue Mfg. Co., C. J.

Indigo.
(See Dyestuffs and Chemicals).

Industrial Relationship Service.
Sherman Service, Inc.

Injectors.
Lunkenheimer Co.
Sherwood Mfg. Co.

Insulation—Vulcanized Fibre.
Diamond State Fibre Co.

Insurance.
Miller Indemnity Underwriters.

Ink—Stencil and Marking.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Lovingood Co.
Regnas & Co., J. R.

Iron Work—Ornamental.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Cyclone Fence Co.
Dowman, George.
Dufur & Co.
Lombard Iron Works & Supply Co.

Jacks.
Paulus, Chas. B.

Jacquards.
Crompton & Knowles Loom Wks.

Jerker Straps.
Augusta Mill Supply Co.

Jute Bagging Machine.
Smith & Furbush Machine Co.

Kettles—Size.
(See Size Kettles).

Kettles—Soda.
Lombard Iron Works & Sup. Co.

Kiers.
(See Bleacher' Kiers).

Knit Goods Specialties.
Knit Goods Specialty Co.

Knit Goods.
(See Cotton Cloth Commission Merchants and Dealers).

Knit Goods Washers.
(See Washers—Cloth).

Knitting Machinery and Supplies.
Brinton Co., H.
General Machine Works.
Hemphill Mfg. Co.
Paulus, Chas. B.
Scott & Williams.
Wildman Mfg. Co.

Laboratory Instruments and Thermometers.
Tagliabue Mfg. Co., C. J.

Lacing—Belt.
(See Belt Lacing).

Lamps—Incandescent and Arc.
Benjamin Electric Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Crouse-Hinds Co.
Cutter Works, George.
General Electric Co.
Jones Mchry. Corp.
Walraven Co.
Westinghouse Elec. & Mfg. Co.
Westinghouse Lamp Co.

Lamp Guards—Key Locking.
Flexible Steel Lacing Co.

Lamp Reflectors.
Benjamin Electric Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Crouse-Hinds Co.
Cutter Works, George.
Westinghouse Elec. & Mfg. Co.

Landscape Architects.
(See Village Architects).

Lappers.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

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Paulus, Chas. B.

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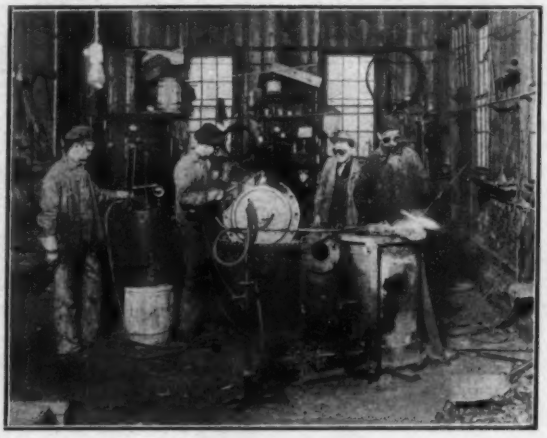

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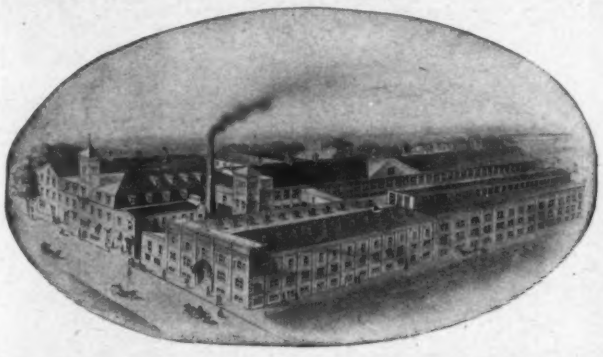

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Whitin Machine Works.

Spinning Rings.
Draper Corporation.
Howard & Bullough.
Greenville Spool & Mfg. Co.
Greist Mfg. Co.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

Spinning Tape Specialists.
American Textile Banding Co., Inc.
Barber Mfg. Co.
Campbell Mfg. Co.
Knit Goods Specialty Co.

Spooling Machinery.
Draper Corporation.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Spools and Skewers.
Greenville Spool & Mfg. Co.
Shambow Shuttle Co.
Walraven Co.

Sprinkler Tanks.
(See Tanks, Towers, Etc.).

Sprockets.
Link-Belt Company.
Morse Chain Co.

Stamping—Die Transfer System.
Kaumagraph Co.

Stamps, Stencils and Stencil Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Lovingood Co.
Regnas & Co., J. R.

Stand Pipes.
(See Tanks, Towers, Etc.).

Starch and Gums.
(See Finishing and Sizing Materials).

Steam Engines.
(See Engines—Steam).

Steam Hose.
(Ste Hose—Steam).

Steam Pumps.
(See Pumps—Steam).

Steam Traps.
(See Traps—Steam).

Steel Buildings.
Dowman, George.

Steel Doors, Window, Partition, Etc.).
Detroit Steel Products Co.
Dowman, George.
Lupton's Sons Co., David.
Seawell, Luke.

Steel Lockers.
Medart Mfg. Co., Fred.
Seawell, Luke.

Stencils and Stencil Papers.
(See Stamps and Stencils).

Stencil Brushes.
(See Marking Pots and Brushes).

Stencil Cutting Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Lovingood Co.
Regnas & Co., J. R.

Sticks (Picker).
See Picker Sticks.

Stop Motion.
Crompton & Knowles Loom Wks.
Draper Corporation.
Whitin Mch. Wks.
Wildman Mfg. Co.

Stokers.
Cokal Stoker Co.
Detroit Stoker Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries.
Edison Storage Battery Co.

Storage Racks.
(See Shelving).

Straps—Lug.
Augusta Mill Supply Co.
Garland Mfg. Co.

Strapping.
(See Leather Specialties or Band Strapping).

Street Lighting Fixtures.
Cutter Works, George.

Supplies—General Mill.
Augusta Mill Supply Co.
Hulme, J. S.
Jones Mchry. Corp.
Howard Bros. Mfg. Co.
Nashville Industrial Corp.
Regnas & Co., J. R.
Seeger Machine Tool Co.
Slaughter Machinery Co., G. G.
Southern Distributing Co.
Steel Heddle Mfg. Co.
Upchurch, C. L.
Walraven Co., The.

Switches—Knife-Elec.
Crouse-Hinds Co.
Cutter Works, George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Switchboards—Panel.
Crouse-Hinds Co.
Cutter Co., George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Tables, Chairs, Etc.
Hill-Standard Co.
Manufacturing Equipment & Engineering Co.
Medart Mfg. Co., Fred.
Pick & Co., Albert.
Reischmann Co.
Wright Co.

Tachometers.
Tagliabue Mfg. Co.

Tag Addressing Machines.
Regnas & Co., J. R.

Tallow.
(See Finishing Materials).

Tanks and Tubs.
Hightower Box & Tank Co.
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BUYERS' INDEX—Continued.

Textile Finishing Machinery Co., The.
Walsh & Weidner Boiler Co.

Tapes and Braids.
American Textile Banding Co., Inc.
Barber Mfg. Co.
Knit Goods Specialty Co.
Weimar Brothers.

Tape Looms—Cotton.
Fletcher Works.
Schaum & Uhlinger.

Tape—Slasher.
Lovingood Co.
Regnas & Co., J. R.

Tapes—Spinning and Twisting.
Barber Mfg. Co.
Knit Goods Specialty Co.

Tape Making Machines.
(See Bandage and Tape Mach.)

Telephones—Calling System.
Carter Electric Co.

Temperature Controllers.
Carrier Eng. Corp.
General Electric Co.
Parks-Cramer Co.
Powers Regulator Co.
Sturtevant Co., B. F.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Temples.
Draper Corporation.

Tenters.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

Tenter Frame Guider (Electric).
Blake Electric Mfg. Co.

Textile Machinery.
(See Cotton Mill Machinery).

Theatre Equipment.
Lucas Theatre Supply Co.
Southern Theatre Equip. Co.

Thermometers—All Kinds.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Thin Place Preventers.
Draper Corporation.

Thread Guides.
Palmer Co., The I. E.

Tiering Machines.
Collins, J. D.
Lovingood Co.
Portable Mchry. Co.
Regnas & Co., J. R.

Ties—Baling.
(See Bale Ties).

Tires—Auto and Truck.
U. S. Rubber Co.

Toilets.
Crane Co.
Dail Steel Products Co.
Manufacturing Equipment & Engineering Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

Tools—All Kinds.
Jones Mchry. Corp.
National Machine Tool Co.
Seeger Machine Tool Co.
Walraven Co., The.

Top Flats Reclothed.
Howard Bros. Mfg. Co.

Towers.
(See Tanks and Towers).

Tractors—Electric, Industrial.
Collins, J. D.
Elwell-Parker Elec. Co.
Regnas & Co., J. R.

Transmission—Power.
(See Power Transmission Machinery).

Transfer Points.
Paulus, Chas. B.

Traps—Return Steam.
American Blower Co.
Morehead Mfg. Co.

Trucks—Auto.
Packard Motor Car Co.
White Co., The.

Truck & Wagon Loaders.
Portable Mchry. Co.

Trucks, Baskets, Etc., Canvas.
Lane & Bro., W. T.

Trucks—Electric—Inter.
Collins, J. D.
Elwell-Parker Electric Co.
Regnas & Co., J. R.

Trucks—Hand and Elevating.
Collins, J. D.
Elwell-Parker Elec. Co.
Handy Equip. Corp.
Hulme, J. S.
Lovingood Co.
Regnas & Co., J. R.

Trucks—One Man.
Handy Equip. Corp.

Trucks—Fibre—Inter, Etc.
Diamond State Fibre Co.
Keystone Fibre Co.
Standard Fibre Co.

Tubes—Cloth.
Diamond State Fibre Co.

Turbines—Steam.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Twisting Machinery and Supplies.
Barber Mfg. Co.
Draper Corporation.
Howard & Bullough.
Knit Goods Specialty Co.
Saco-Lowell Shops.
Smith & Furbush Mach. Co
Whitin Machine Works.

Unloader &Bag Pilers.
Portable Mchry. Co.

Urinals.
Crane Co.
Dail Steel Products Co.
Rundle-Spence Mfg. Co
Vogel Co., Jos. A.

Unions—Bronze.
Crane Co.
Jenkins Bros.
Lunkenheimer Co.

Vacuum Cleaning System for Mills
United Electric Co.

Vacuum Pans.
Cresson-Morris Co.

Valves—Angle, Globe Cross, Blow-off, Check, Gate, Pop-Safety, etc.).
Crane Co.
Jenkins Bros.
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Valves—Non-return Stop.
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Valve Discs.
Graton & Knight Mfg. Co.
Jenkins Bros.

Varnishes.
Barrett Co.
Cooledge & Sons, F. J.
Du Pont de Nemours & Co., E. I.
Hampden Paint & Chem. Co.
Johnson & Co., Inc., Oliver.
Patterson-Sargent Co.
Peaslee-Gaulbert Co., Inc.
Southern Cotton Oil Co.
Tropical Paint Co.
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Ventilating Apparatus.
American Blower Co.
Carlisle & Gale Co.
Carrier Eng. Corp.
General Electric Co.
Parks-Cramer Co.
Perkins & Son, Inc., B. F.
Sargent's Sons Co., C. G.
Seawell, Luke.
Sturtevant Co., B. F.
Tolhurst Machine Co.

Vises and Benches.
Richards-Wilcox Mfg. Co.

Village Architects and Designers
Lockwood, Green & Co.
Sirrine, J. E.
Spiker & Lose.
Tuxbury Lumber Co., A. C.

Village Houses.
(See Houses—Ready-Built).

Wagon and Car Unloaders.
Curtis Pneumatic Mchry. Co.
Portable Machinery Co.

Warehouse—Portable.
(See Buildings).

Warehouse Door Hardware.
(See Doors and Hardware).

Warp Drawing Machine.
Cocker Machine & Fdry. Co.
Crompton & Knowles Loom Wks.

Warpers and Warping Machinery.
Cocker Mch. & Fdry. Co.
Draper Corporation.
Howard & Bullough.
Mossberg Co., Frank.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Warp Compressing Mch. Co.

Wash Basins.
(See Lavatories).

Washers—Cloth.
American Laundry Machinery Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Fdry. Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Mchry. Co.
Tolhurst Mch. Wks.

Washers.
Diamond State Fibre Co.
Graton & Knight Mfg. Co.

Waste Dealers.
Valley Waste Mills.

Waste Machinery—Cotton.
Howard & Bullough.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Co.

Watchman Clocks.
(See Clocks—Watchman).

Water Coolers—Fountain).
Central Brass Mfg. Co.
Crane Co.
Manufacturing Equipment & Engineering Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Southern States Supply Co.
Taylor, Halsey W.

Water Columns.
Lunkenheimer Co.

Water Softeners.
American Water Softener Co.
Borromite Co. of America.
Hulme, J. S.
Permutit Co.
Refinite Co.
Scaife & Sons Co., Wm. B.

Water Towers.
(See Tanks and Towers).

Waterproofing Machinery.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co., The.

Weaving.
(See Yarn Manufacturers).

Welding Apparatus—Electric Arc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Welding Apparatus and Supplies—Oxy-Acetylene.
Commercial Acetylene Supply Co.
Southern Welding Co.
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Autogenous Welding Co.
Southern Welding & Mach. Co.
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Welfare Architects.
(See Village Architects).

Welfare Equipment.
Central Brass Mfg. Co.
Chattanooga Queensware Co.
Crane Co.
Cutter Works, George.
Hill Standard Co.
Ideal Lawn Mower Co.
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Medart Mfg. Co., Fred.
Pick & Co., Albert.
Puro Sanitary Drinking Fountain Co.
Reischmann Co.
Sanitas Co.
Southern Theatre Equip. Co.
Stieff, Inc., Chas. M.
Taylor, Halsey W.
Thomas Co., F. H.
Westinghouse Elec. & Mfg. Co.
Wright Co.

Well Drilling.
Hughes Specialty Well Drilling Co.
Robbins, J. E.

Wheels—Fibre.
(See Fibre Products).

Wheel Puller.
General Electric Co.
Greb Co., Inc.

Whistles—Steam.
Crane Co.
Lunkenheimer Co.

Whizzers.
Tolhurst Mch. Wks.

Winders.
Firsching, J. A.
Howard & Bullough, American Machine Co.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Stafford Co., The.
Universal Winding Co.

Windows—Steel.
Detroit Steel Products Co.
Dowman, George.
Lupton's Sons Co., David.
Seawell, Luke.

Wires—Drop.
(See Drop Wires).

Wiring Conduits and Fittings.
See Electric Conduits.

Wiring—Electrical.
(See Electrical Contractors).

Wood.
(See Lumber).

Wood Boxes.
(See Packing Cases.)

Wood Preserver.
Barrett Co.
Du Pont de Nemours & Co., E. I.
Gulf States Creosoting Co.
Johnson & Co., Inc., Oliver.
Patterson Sargent Co.
Peaslee-Gaulbert Co., Inc.
Southern Cotton Oil Co.
Tropical Paint Co.
Wadsworth, Howland & Co., Inc.

Wood Pulleys.
(See Pulleys).

Woodworkers' Benches and Vises.
Richards-Wilcox Mfg. Co.

Woolen Machinery.
Butterworth & Sons Co., H. W.
Crompton & Knowles Loom Wks.
Schofield Co., Wm.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Smith & Furbush Mach. Co.
Stafford Co., The.
Textile Finishing Machinery Co.
Whitin Machine Works.

Wrenches.
Lane Unique Tool Co., Wm. B.

Yarn Manufacturers.
American Processing Co.
Arkray Mills, Inc.
Arlington Cotton Mills.
Arrow Mills, Inc.
Flint Mfg. Co.
Florsheim, H. A.
Gray Mfg. Co.
Hunter Mfg. & Comm. Co.
Myrtle Mills, Inc.
Parkdale Mills, Inc.
Weimar Bros.

Yarn Dealers & Comm. Merchants.
(See Cotton Yarn and Cloth Commission Merchants and Dealers).

Yarn Dyers.
(See Dyers).

Yarn Testers.
Scott & Co., Henry L.

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Advertisers' Index

Aberthaw Construction Co. ... 39
Aldrich Machine Works 272
Allen Spindle Corp. ..... *
Allis-Chalmers Mfg. Co. 275
American Audit Co. 291
American Blower Co. ..... *
American Cast Iron Pipe Co. ..276
American City Engineering Co. *
American Kron Scale Co. 297
American Laundry Mchry. Co.243
American Machine Co., H. & B.351
American Processing Co. 256
American Scrubbing Equipment Co. 21
American Supply Co. 258
American Textile Banking Co., Inc. 394
American Water Softener Co...248
Anchor Post Iron Works 356
Arabol Mfg. Co. 297
Arex Co. 272
Arkray Mills, Inc. 277
Arlington Cotton Mills 277
Arnold, Hoffman & Co. 252
Arrow Mills, Inc. 277
Atlanta Brush Co. 258
Atlanta National Bank 281
Atlantic Dyestuff Co. 254
Atlanta Rubber Stamp & Stencil Works 295
Atlas Electric Devices Co. .... *
Augusta Mill Supply Co. 289
Autogenous Welding Co. 289

Barber-Colman Co. 291
Barber Mfg. Co. 293
Barrett Co., The 349
Beer, H. & B. 278
Benjamin Electric Co. ..... *
Birmingham Slag Co. 270
Blake Electric Mfg. Co. 259
Borne, Scrymser Co. 248
Borromite Co. of America 248
Bosson & Lane 257
Bradley Mfg. Co., A. J. 392
Brinton Co., H. 390
Brunswick-Balke-Collender Co.. *
Butterworth & Sons Co., H. W.242

Campbell Mfg. Co. 285
Carlisle & Gale Co. 273
Carlyle-Johnson Machine Co...272
Carrier Engineering Corp. 291
Carter Electric Co. 275
Carver-Beaver Yarn Co. 392
Central Brass Mfg. Co. 264
Chattanooga Queensware Co... *
Chicago Pulley & Shafting Co. *
Chicago Watchmen's Clocks Works 374
Ciba Co., Inc. 2
Citizens & Southern Bank ...278
Classified Opportunities 282 & 283
Cocker Machine & Foundry Co.244
Cokal Stoker Co. 295
Collins, J. D. 268
Commercial Acetylene Supply Co. 372
Cooledge & Sons, F. J. 268
Cooper Hewittt Electric Co... *
Corn Products Refining Co. ...255
Cortright Metal Roofing Co....241
Crane Co. 37
Cresson-Morris Co. 273
Crompton & Knowles Loom Works 14
Crouse-Hinds Co. 47
Curtis Pneumatic Machinery Co.267
Cutter Works, George 11
Cutts Co., E. A. 276
Cyclone Fence Co. 299

Dail Steel Products Co. ..... *
Davis, Roger W. 14
Detroit Steel Products Co. ..6 & 7
Detroit Stoker Co. 378
Diamond State Fibre Co. 263
Dixon Crucible Co., Joseph ...376
Dobbins Soap Mfg. Co. 394
Dodge Sales & Eng'g Corp. 33
Dowman, George ..... *
Draper Corporation 3
Dufur & Co. 276
Du Pont de Nemours & Co., E. I. 251

Eco Clock Co. 260
Economy Baler Co. 295
Edison Storage Battery Co. .. *
Electric Smelting & Aluminum Co. 394
Electro Bleaching Gas Co. 241
Elwell-Parker Electric Co. ... *
Emmons Loom Harness Co. 291
Erdle Perforating Co. 291
Ernst & Ernst 360

Fafnir Bearing Co. 368
Fawcett, Hughes 278
Ferguson Co., John W. ..... *
Firschine Co., J. A. 394
Flexible Steel Lacing Co. 27
Fletcher Works 246
Flint Mfg. Co. 277
Florsheim, H. A. 277
Fonda Organization, The E. A. 13
Ford Co., J. B. 252
Foundation Co., The 46
Franklin Process Co. 245

Galland-Henning Mfg. Co. ...376
Garland Mfg. Co. 374
General Electric Co. ..... *
General Machine Works 394
Georgia Railroad 289
Goode, R. L. 276
Grasselli Chemical Co. ..... *
Graton & Knight Mfg. Co. 297
Gray Mfg. Co. 277
Greb Co. 297
Gregory & Gregory, Walter ..392
Greenville Spool Mfg. Co. 258
Greist Mfg. Co. 17
Gude & Co. 276
Gulf States Creosoting Co. ..270

Hackney Bros. 276
Hampden Paint & Chem. Co. ...271
Handy Equipment Co. ..... *
Hemphill Mfg. Co. 382
Hightower Box & Tank Co. ..266
Hill Standard Co. 262
Howard Bros. Mfg. Co. 20
Howard & Bullough Mach. Co..351
Hughes Specialty Well Drilling Co. 276
Hulme, J. S. 374
Hunter Mfg. & Comm. Co. ... *
Huntington & Guerry, Inc. ... *
Hyatt Roller Bearing Co. ....4, 5, 8 & 9

Ideal Lawn Mower Co. 265
International Eng'g Works ... 36
Irving National Bank 363
Iselin & Co., Wm. 392

Jenkins Bros. 274
Jones Machinery Corp. 289
Johnson & Co., Inc., Oliver ... 44
Jordan Mfg. Co. 374

Kali Mfg. Co. 254
Kaumagraph Co. 372
Keever Starch Co. 252
Keystone Fibre Co. 260
King, Jr., Habersham 392
Kirkpatrick Lumber & Timber Co. 293
Klauder-Weldon Dyeing Mach. Co. 246
Klipstein & Co., A. 257
Knit Goods Specialty Co. 372

Ladew Co., Edw. R. 287
Lane & Bro., W. T. 259
Lane Unique Tool Co., Will B.272
Lewis, John D. 392
Link-Belt Co. 28
Lockwood, Green & Co. 269
Lombard Iron Works 291
Lovingood Co., The 374
Lowell Crayon Co. 241
Lunkenheimer Co. 15
Lupton's Sons Co., David ... 41

Manufacturing Equipment & Engineering Co. 264
Marshall Co., H. Newton 273
Mason Machine Works 16
Mathews Gravity Carrier Co...354
Medart Mfg. Co., Fred 297
Merrow Machine Co. 388
Metz Co., H. A. 253
Millers Indemnity Underwriters 280
Mitchell-Bissell Co. ..... *
Monroe Calculating Mch. Co...263
Moore Oil & Refining Co. .... *
Morehead Mfg. Co. 1
Morse Chain Co. 295
Mossberg Co., Frank ..... *
Myrtle Mills, Inc. 277

Nashville Industrial Corp....283
National Aniline & Chemical Co. 48
National Association of Box Manufacturers 23
National Asso. Hosiery & Underwear Mfgrs. 388
National Bank of Commerce In New York 280
National Machine Tool Co. ...273
National Metal Molding Co. ..378
National Shawmut Bank 279
New York & N. J. Lub Co... 35
Newport Chemical Co. 364

Packard Motor Car Co. 24
Palmer Co., E. L. 262
Parks-Cramer Co. 10
Patterson Sargent Co. ..... *
Paulus, Chas. B. 390
Parkdale Mills, Inc. 277
Pearson, Jos. T. 394
Peaslee-Gaulbert Co. ..... *
Perkins & Son, Inc., B. F. ...257
Permutit Co. 249
Phila. Drying Mchry. Co. 298
Pick & Co., Albert ..... *
Portable Machinery Co. 293
Powers Regulator Co. 248
Proctor & Schwartz, Inc. 246
Puro Sanitary Drinking Fountain Co. 264

Refinite Co., The ..... *
Regnas, J. R. 267
Reichmann Co. ..... *
Reliance Machine Works 390
Richards-Wilcox Mfg. Co. ...268
Robbins & Sons 276
Robert & Co. 38
Rock Glen Salt Co. 293
Roessler & Hasslacher Chemical Co. 370
Rome Mch. & Fdry. Co. 241
Roy & Sons Co., B. S. 16
Rundle-Spence Mfg. Co. 266
Russell Mfg. Co. 366

Saco-Lowell Shops 14
Salem Iron Works 24
Sanitas Co. 5
Sargent's Sons Corp., C. G. 24
Scaife & Sons Co., Wm. B. 29
Schaum & Uhlinger 24
Schofield Sons Co., J. S. 27
Schofield Co., Wm. 29
Scott & Co., Henry L. 36
Scott & Williams 38
Seaboard Air Line Ry. 29
Seawell, Luke 26
Seeger Machine Tool Co. ....
Shambow Shuttle Co. 36
Sherman Service, Inc. 1
Sherwood Mfg. Co. 34
Shower Bath Cabinet Co. .... *
Signode System, Inc. 26
Sirrine, J. E. 42
S K F Industries, Inc. 29
Slaughter Machinery Co., G. G.297
Smith & Furbush Machine Co...26
Sonneborn Sons, Inc., L. ..... *
Southern Bending Co. 1
Southern Brush & Broom Co...36
Southern Cotton Oil Co. 27
Southern Cotton Yarn Co. ... *
Southern Cypress Mfg. Asso... 40
Southern Distributing Co. 256
Southern Railway System .... *
Southern Spindle & Flyer Co...297
Southern States Supply Co. .. *
Southern Theatre Equip. Co... 22
Southern Welding & Mach. Co.276
Spiker & Lose 291
Stafford Co., The ..... *
Standard Conveyor Co. ..... *
Standard Fibre Co. 285
Standard Gas Products Co. ...274
Standard Pressed Steel Co. .... *
Steel Heddle Mfg. Co. 260
Stieff Co., Inc., Chas. 262
Sturtevant Co., B. F. 19
Surpass Chemical Co. 256
Swan & Finch 376

Tagliabue Mfg. Co., C. J. ... *
Taylor Co., Halsey W. ..... *
Taylor Instrument Co. 293
Terrell Machine Co. 366
Texas Co. 32
Textile Banking Co. 280
Textile Finishing Mchry. Co...298
Thomas Co., F. H. 261
Thompson & Binger, Inc. 269
Tolhurst Machine Co. 247
Toomey, Frank, Inc. 288
Torsion Balance Co. 298
Tropical Paint & Oil Co. 43
Tufts Co., Arthur 352
Tuxbury Lumber Co., A. C. ... *

Union Bleaching & Fin. Co. ...282
United Chemical Products Co...287
United Electric Co. ..... *
Universal Winding Co. 295
Upchurch, C. L. 283
U. S. Ball Bearing Co. 26
U. S. Fuel Corp. 295
U. S. Rubber Co. ..... *

Valley Waste Mills ..... *
Vogel Co., Jos. A. 266
Vonnegut Hardware Co. 45

Wadsworth, Howland & Co. Inc. ..... *
Walke Box Co., Inc. 392
Wall & Son, C. M. 392
Walraven Co., The 20
Walsh & Weidner Boiler Co. ..287
Want Ads .....282 & 283
Warren Soap Mfg. Co. 359
Weimar Bros. 277
Westinghouse Electric & Mfg. Co. ..... *
Westinghouse Lamp Co. ..... *
Whitinsville Spinning Ring Co.261
White Co. ..... *
Whitin Machine Works 18
Whiton Machine Co., D. E. ...272
Williams & Sons, I. B. ..... *
Wildman Mfg. Co. 384
Wolf & Co., Jacques 254
Wood's Sons Co., T. B. 31
Woodward, Baldwin & Co. ...278
Wright Co. ..... *

Zavon Co., Inc. 250

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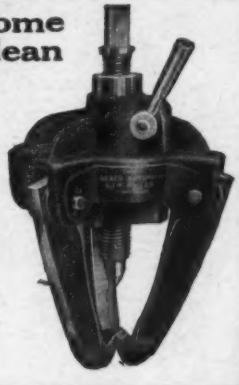

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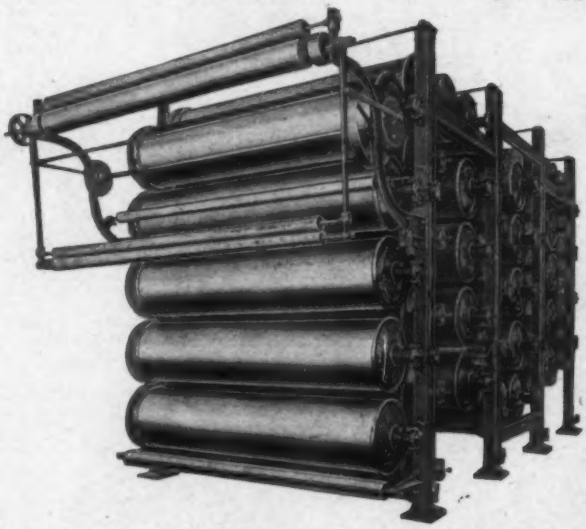

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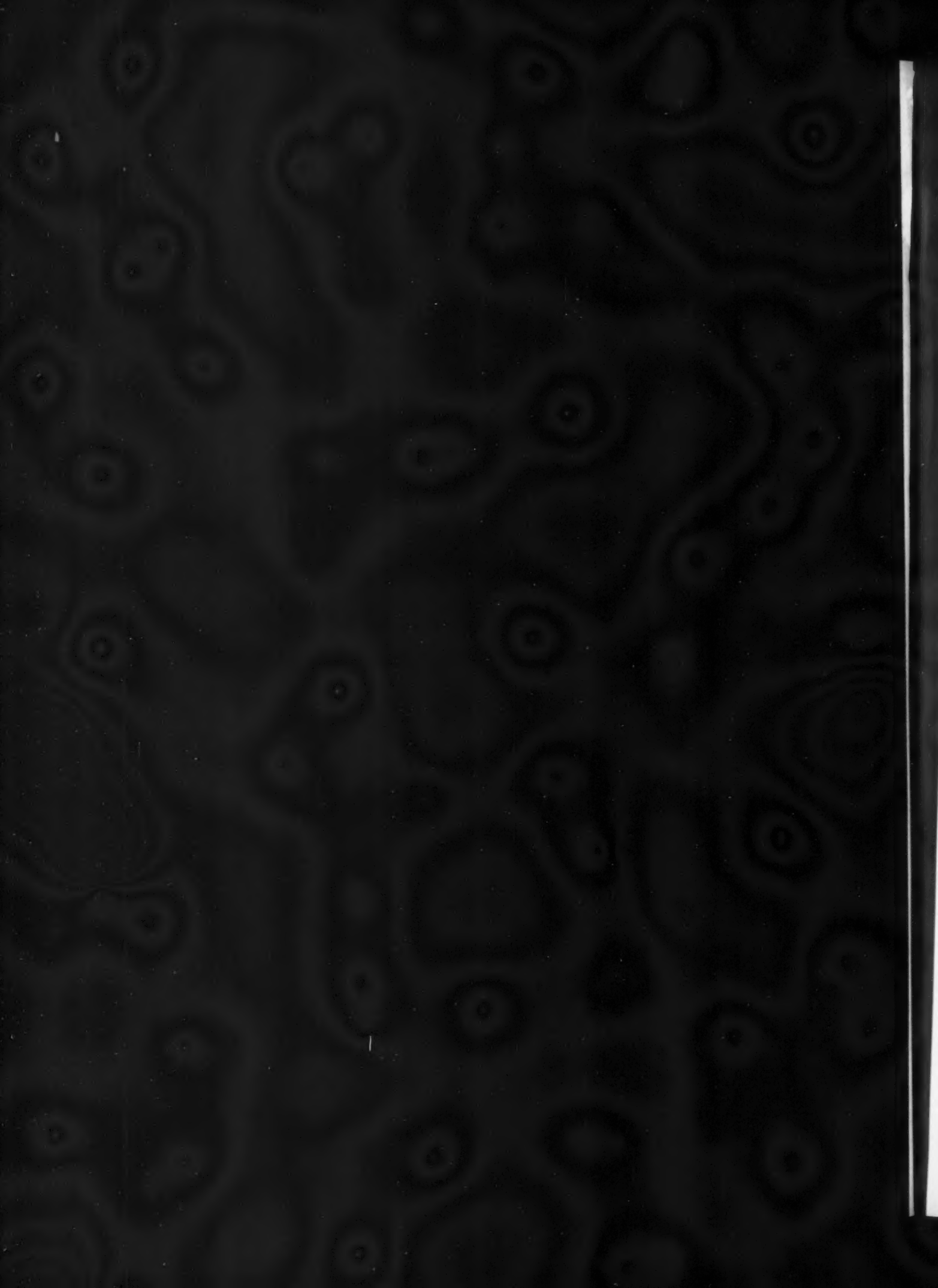

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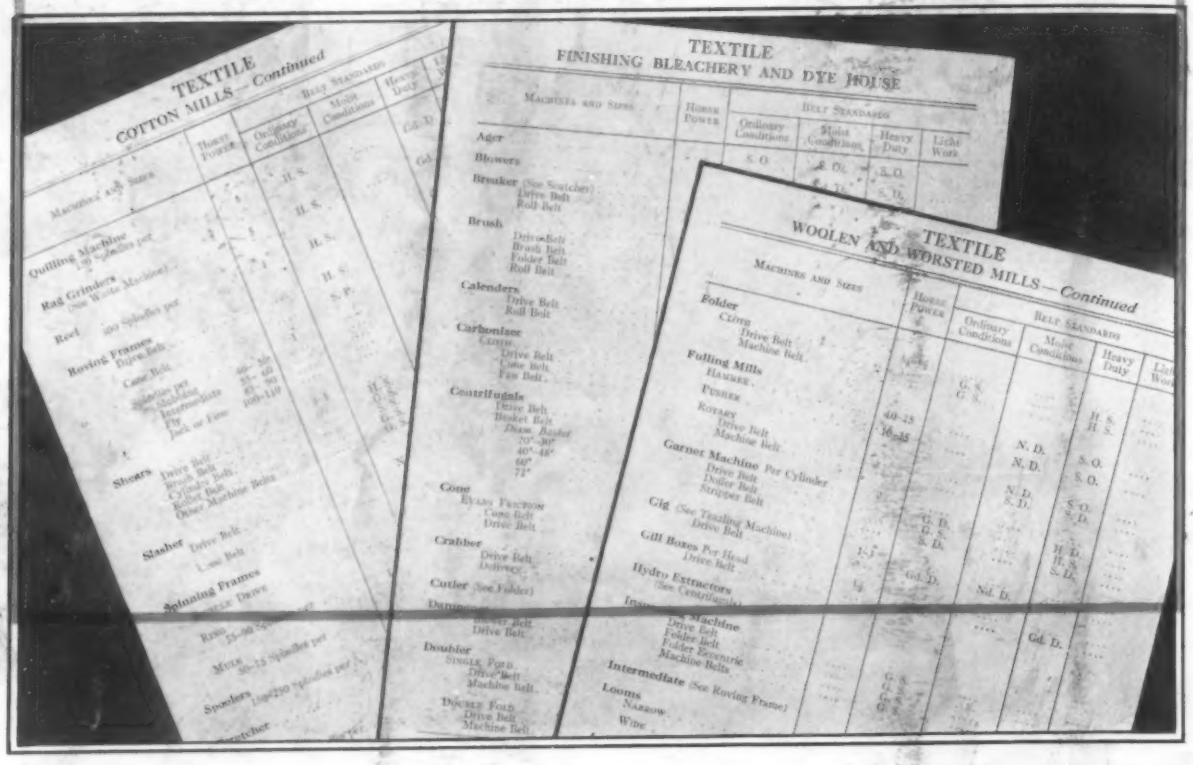

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